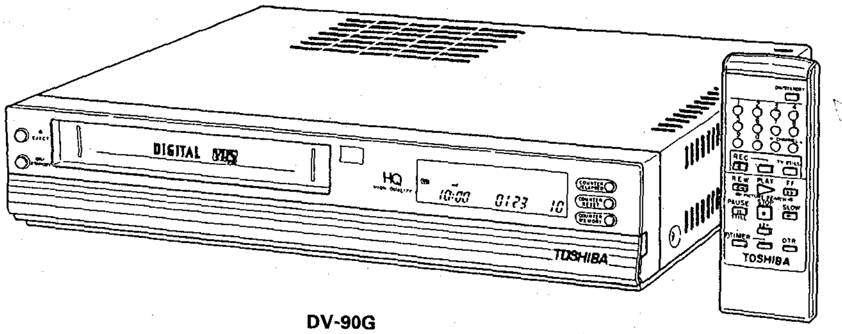
SERVICE DATA
FILE NO. 030 - 223

BN02

TOSHIBA

COLOR VIDEO CASSETTE RECORDER

DV-90G/T/W



DV-90G

SPECIFICATIONS

GENERAL

Video recording system:	Head configuration 2-head rotary
Video signal:	CCIR standard PAL color
Storage temperature:	−20° to +60°C (−4° to +140°F)
Operating temperature:	5° to 40°C (41° to 104°F)
Antenna:	75-ohms external aerial terminal for UHF
Channel coverage:	

	STD	CATV
VL	E2 — E4 (DV-90G/W)	X, Y, Z
	A, B, C (DV-90T)	
VH	E5 — E12 (DV-90G/W)	S1 — S20
	D — H1, H2 (DV-90T)	
UHF	21 — 69	—

a total of up to 32 preselected channels

AERIAL output signal:	UHF channel E31 to E39 (variable)
Power requirement:	AC 220V, 50 Hz
Power consumption:	28W
Weight:	7.4 kg
Dimensions:	430 x 85 x 348mm (W/H/D)

VIDEO

Input:	VIDEO LINE IN: 21 pin Euro-connector, 1.0V(p-p), 75-ohms unbalanced, sync negative
Output:	VIDEO LINE OUT: 21 pin Euro-connector, 1.0V(p-p), 75-ohms unbalanced, sync negative
Signal-to-noise ratio:	Better than 43 dB

AUDIO

Input:	AUDIO LINE IN: 21 pin Euro-connector, more than 10 k-ohms, −5 dBs
Output:	AUDIO LINE OUT: 21 pin Euro-connector, less than 1 k-ohm, −5 dBs
Frequency response:	80 to 10 kHz
Signal-to-noise ratio:	Better than 42 dB

TAPE TRANSPORT

Tape speed:	23.39 mm/sec.
Maximum recording-time:	4 hours (with E-240)
Fast forward time:	Within 6 min. (E-180)
Rewind time:	Within 6 min. (E-180)

TIMER

Fluorescent digital display
Count down from AC-line frequency

Caution: Copyright Act 1956 Users of video recording equipment should note that it may be unlawful to record television broadcasts, cinematograph films or video recording without the permission of the relevant copyright owner.

Design and specifications are subject to change without notice.

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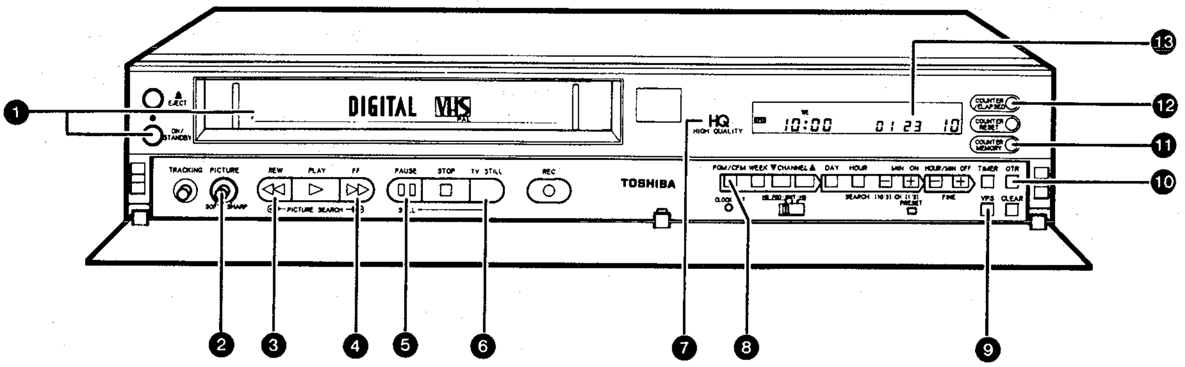
SECTION 1
GENERAL DESCRIPTION

OPERATING INSTRUCTIONS

FEATURES



❶ **Auto Power On and Fully-Automatic Play Function**
Even when the VTR unit is off, it will turn on automatically and then start playing when a video cassette without safety tab is inserted.

❷ **Picture Control**
This control allows you to select a softer or sharper picture.

❸ **Reverse Picture Search**
Pressing the REW button in the playback mode allows you to play the tape quickly in the reverse direction about 7 times the normal speed and find the part you want to review.

❹ **Forward Picture Search**
Pressing the FF button in the playback mode allows you to play the tape quickly in the forward direction about 7 times the normal speed and find the part you want.

❺ **Digital Still Picture**
The picture stops perfectly on the screen during playback thanks to the newly-developed digital circuitry.

❻ **TV Still Picture**
Through the newly-developed digital circuitry, the TV programme picked up by the tuner can be viewed in still mode without noise and blur.

❼ **High Quality Picture**
The HQ (High Quality) feature reduces the noise of the brightness and colour signals. Image outline and detail are improved.

❽ **Programme Check**
By pressing this button in the timer mode, the contents of the programme will be displayed consecutively on the fluorescent display. A great convenience for programming.

❾ **VPS-System (DV-90G)**
This function features the fully recording of the television programmes having VPS signals, from start to end, even if your desired television programme's start time is changed or rescheduled.

❿ **One Touch Timer Recording**
This button can be pressed while in any mode to start immediate recording. The unit will record in periods of 30 minutes each time the button is pressed. The recording can be as long as 4 hours.

⓫ **Memory Function**
When the memory function is on, the tape stops at a counter reading of about "0000".

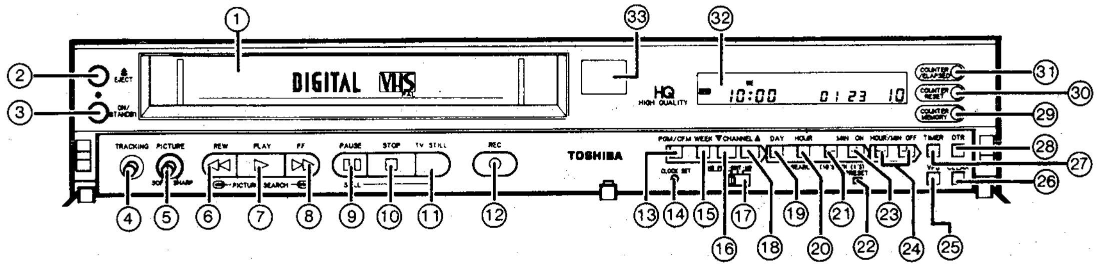
⓬ **Counter Memory and Elapsed Functions**
These buttons are used for two different operations. The one is the counter function, the other is the elapsed time function.
The elapsed time function tells you how long you have been recording a tape.

⓭ **Multifunctional Fluorescent Display**

Advanced Timer Function
The Upgraded timer function can be operated for 4 events. There is also a 21-day 4-programme setting.

FS (Frequency Synthesized) Tuner
This FS tuner automatically selects with the utmost accuracy, all receivable channels.

FRONT PANEL



FRONT PANEL

① **Cassette Compartment**
Slide the cassette into the unit until the mechanism draws it in automatically.

② **EJECT button**
Press this button to remove the cassette while the power is on.

③ **ON/STANDBY button**
This button is used to turn the VTR on and off.

④ **TRACKING control**
Use this control during playback to adjust the picture and eliminate or reduce noise.

⑤ **PICTURE control**
To make the picture sharper, turn the control clockwise; to make the picture softer, turn the control counterclockwise.

⑥ **Rewind button (REW)**
Press this button to rewind tapes. During the playback mode, pressing this button will allow you to play tapes in reverse rapidly.

⑦ **PLAY button**
Press this button to play back the pre-recorded cassettes.
The PLAY indicator comes on.

⑧ **Fast forward button**
Press this button to move tapes forward rapidly. During the playback mode, pressing this button will allow you to play tapes in the forward direction rapidly.

⑨ **PAUSE/STILL button**
Used to operate the VTR in two different ways:
A) To temporarily stop the tape in the recording mode.
B) To view a digital still picture with no noise or blur in the playback mode.

⑩ **STOP button**
Press this button to stop the tape or interrupt the fully-automatic function.

⑪ **TV STILL button**
Use this button to freeze a picture received through the VTR tuner in the stop mode.

⑫ **Record button (REC)**
Press to start recording. The REC indicator comes on.

⑬ **PGM/CFM button**
This button has two functions:
Programme number selection and programmed data check.
Used to start timer operation and specify programme numbers 1 through 4 where the programme data is placed.
Also used to check the previously inputted programme data. Once this button is pressed, the programme scanning starts to continuously show the contents of the programme data 1 through 4 (start time and end time) on the fluorescent display.

⑭ **CLOCK SET button**
Used to set or reset the VTR clock. When this button is pressed once, the unit enters the clock set mode. When the button is pressed again after adjusting the VTR clock, the VTR clock starts to work.

⑮ **WEEK button**
Used to select the timer programmes for one day of the next week, one day of the third week and one day of every week.

⑯ **Channel select button (down)**
Used to select the specific channel which you wish to view or record. When the button is pressed once, the channel digit decreases by one.

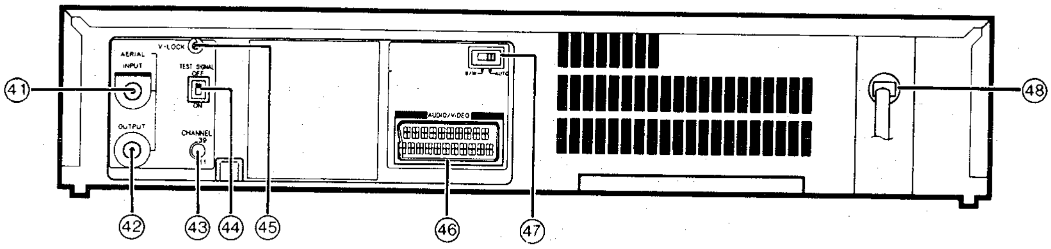
⑰ **HQ PRO/EDIT/HQ switch**
HQ PRO: When recording in this position, enabling a distinct picture for recording and playback. We recommend this position for recording.
HQ: For recording in an area where the broadcast is weak, this position may improve picture quality. Also, when snow occurs during playback, set to this position.
EDIT: Set in this position when copying.

⑱ **Channel select button (up)**
Used to select the specific channel which you wish to view or record. When the button is pressed once, the channel digit increases by one.

⑲ **DAY button**
Used to specify the day. When the button is pressed once, the day of the week advances by one. When the button is kept pressed down, the days advance rapidly. Also used to select the programme for every day.

⑳ **HOUR button or SEARCH button**
Used to specify the hour digits. When the button is pressed once, the digit increases by one. When the button is kept pressed down, the hours change rapidly. Also used to search for the desired channel during channel presetting operation.

REAR PANEL



㉑ **MIN (−) button or channel 10's button**
Used to specify the minutes. When the button is pressed once, the digit decreases by one. When the button is kept pressed down, the minutes decrease rapidly. Also used to directly select the channel to be preset. When the button is pressed once, the channel changes by 10's digit.

㉒ **PRESET button**
Used to preset the channel.

㉓ **MIN (+) button or channel 1's button**
Used to specify the minutes. When the button is pressed once, the digit increases by one. When the button is kept pressed, the minutes increase rapidly. Also used to directly select the channel to be preset. When the button is pressed once, the channel changes by 1's digit.

㉔ **HOUR/MIN button or FINE (−)/(+) button**
Used to set the hour and minutes of your recording end time. When the button (+) is pressed once, the end time display increases by one minute. When the button (−) is pressed once, the end time display decreases by one minute. When the button is kept pressed down, the minutes increase or decrease rapidly according to the button actually pressed. Also used to make fine adjustment during channel operation.

㉕ **VPS button (DV-90G)**
Used to switch the VPS recording on or off.

㉖ **CLEAR button**
Used to cancel the data that was preset to the programme numbers 1 through 4. Select the programme number where the preset data is to be cancelled with the PGM/CFM button, press the CLEAR button.

㉗ **TIMER button**
Used to enter the timer mode. To release the timer stand-by mode, press it again.

㉘ **OTR button**
Used to carry out recording in units of 30 minutes in normal mode. (Up to 4 hours)
Used to specify the timer-off time in units of 30 minutes in the timer mode.

㉙ **COUNTER MEMORY button**
When the button is pressed the indicator "M" is displayed and the tape stops at a counter reading of about 0000 during rewinding and fast forward modes.

㉚ **COUNTER RESET button**
By beginning the recording at "0000", subsequent playback will be more convenient.
Pressing this button in the counter mode will reset the tape counter to "0000".
Also used to reset the elapsed time display to "0:00".

㉛ **COUNTER/ELAPSED button**
Used to change the display from counter to elapsed time display or from elapsed time to counter display. The elapsed time function is available only in the recording mode.

㉜ **Fluorescent display**

㉝ **Infrared remote control receiver**
This sensor is used for receiving infrared signals from the Remote Control Unit.

REAR PANEL

㊶ **AERIAL INPUT socket**
Connect the aerial lead to this terminal.

㊷ **AERIAL OUT plug**
Connect this terminal to the socket on the TV.

㊸ **UHF CHANNEL control**
The output from the VTR to your television receiver can be adjusted to any channel from 31 to 39 by using a screwdriver.

㊹ **TEST SIGNAL switch**
Provides a test signal to assist you to tune your television receiver to the output of the VTR.

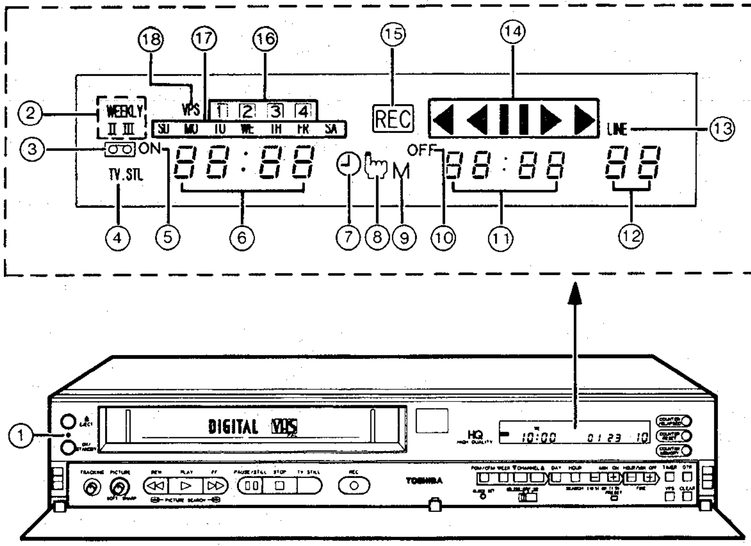
㊺ **V-LOCK control**
The playback picture may be distorted depending on the TV's used for two times playback. Adjust this control to minimum when the picture jitters vertically in the two times playback mode.

㊻ **AUDIO/VIDEO connector**
This 21 pin euro-connector is used to receive audio and video signals from the external source with the same type of socket.

㊼ **B/W-AUTO switch**
This switch should normally be set to the "AUTO" position. In a weak signal area, set this switch to the "B/W" position. In the playback mode, set this switch to the switch setting position used for recording.

㊽ **Power lead**
Connect to wall AC outlet (220V, 50Hz)

INDICATORS



INDICATORS

① **ON/STANDBY indicator (Green)**
Lit when the power is on.

② **WEEK indicator**
Lit when the WEEK button is pressed. (II → III → WEEKLY)

③ **Cassette indicator**
The lamp is lit when a cassette is loaded, even when the power is off. The lamp flashes when a tape is being inserted or ejected.

④ **TV STILL indicator**
Lit when the TV STILL button is pressed.

⑤ **Programme timer start time indicator (ON)**
Lit during timer programme setting.

⑥ **Clock indicator and timer start time indicator**
Shows the current time or timer start time during timer programme setting.

⑦ **Timer indicator**
Lit when the TIMER button is pressed.

⑧ **OTR indicator**
Lights during one touch recording.

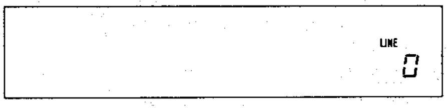
⑨ **Memory indicator**
Lit when the COUNTER MEMORY button is pressed. Goes off when the COUNTER MEMORY button is pressed again.

⑩ **Timer end time indicator**
Lit during timer end time setting operation.

⑪ **Shows the timer programme end time, counter display as well as elapsed time display (only in the recording mode).**

⑫ **Channel indicator**
Lights when a signal is being received from the VTR tuner. Indicates the channel currently watched or recorded.

⑬ **Lit when the channel position is set to 0 to receive the external signals.**



⑭ **Multifunctional indicators**

▶ **PLAY**	‖ **STILL**	REC ▶ **REC**
◀◀ REW/ Reverse Picture Search	▶▶ FF/ Forward Picture Search	I▶ **SLOW**
REC ‖ **PAUSE**		

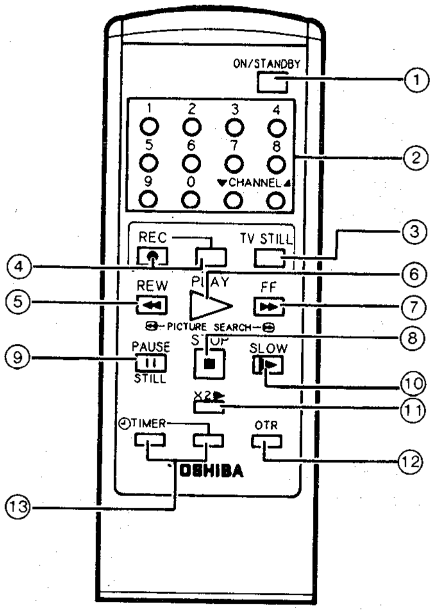
⑮ **REC indicator**
Lit when the REC button is pressed.

⑯ **Programme number indicator**
These lamps indicate the programme number into which a programme setting is being entered when setting the programmable timer.

⑰ **DAY indicator**
Shows the current day for the VTR clock and the day when the timer programme will begin.

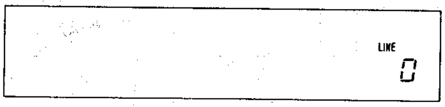
⑱ **VPS indicator (DV-90G)**
Flashes when the VPS signal is being detected or lights when the VPS system is switched on.

REMOTE CONTROL UNIT



① **ON/STANDBY button**
This button is used to turn the VTR on and off.

② **Channel select buttons section**
10 keys: used to directly select the desired channel. When you select channels 1 to 9, combine the 0 key and any of the keys 1 to 9 to make channels such as 01, 02, 03 and so on.
Up/down buttons:
When the up button is pressed, the channel will change in the upper direction (higher channel). When the down button is pressed, the channel will change in the lower direction (lower channel).
Note:
When selecting audio and video signals from external audio and video equipments, select channel position 0 with the up/down buttons or 10 keys. The fluorescent display then shows as follows.



③ **TV STILL button**
Use this button to freeze a picture received through the VTR turner in the stop mode.

④ **Record buttons (REC)**
Press to start recording. The REC indicator comes on. When recording be sure to press the two buttons (right-hand and left-hand) simultaneously.

⑤ **Rewind button (REW)**
Press this button to rewind tapes rapidly. During the playback mode, pressing this button will allow you to play tapes in the reverse direction rapidly.

⑥ **PLAY button**
Press this button to play back pre-recorded cassettes with safety tab or restart playing back the pre-recorded cassettes without safety tab after the fully-automatic function was interrupted.

⑦ **Fast forward button (FF)**
Press this button to move tapes forward rapidly. During the playback mode, pressing this button will allow you to play tapes in the forward direction rapidly.

⑧ **STOP button**
Press this button to stop the tape.

⑨ **PAUSE/STILL button**
Used to operate in two different ways:
A) To temporarily stop the tape in the recording mode.
B) To view a still picture in the playback mode.

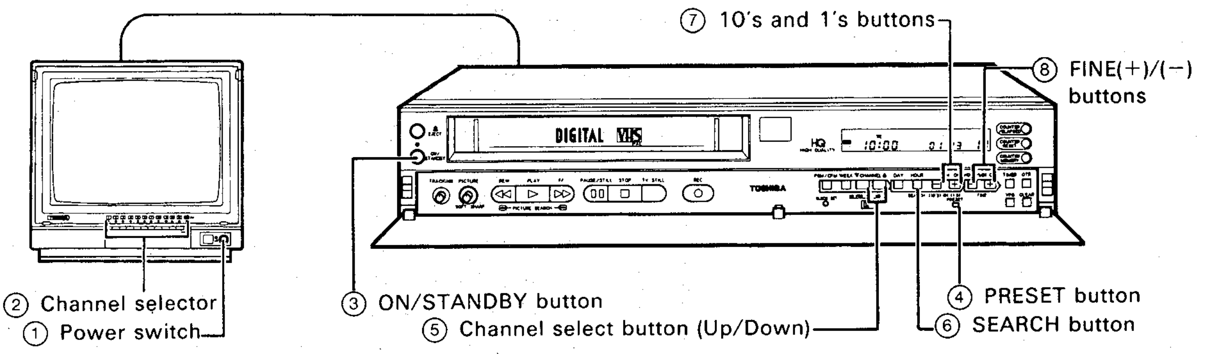
⑩ **SLOW buttons**
This button is used to slowly play back the noiseless picture at 1/6 times the speed of the normal playback.

⑪ **Two times speed playback button (× 2 ▶)**
When the button is pressed in the playback mode, the picture advances at two times the speed of the normal playback. During the two times speed playback, sound is heard and the picture is reproduced without noise.

⑫ **OTR button**
Used to operate the one touch timer recording in units of 30 minutes (up to 4 hours).

⑬ **TIMER buttons**
Used to make the VTR enter the timer mode, especially for the one touch timer recording.
When doing the timer recording, be sure to press the two buttons simultaneously.

CHANNEL SELECTION


⑦ 10's and 1's buttons
⑧ FINE(+)/(−) buttons
DIGITAL
② Channel selector
① Power switch
③ ON/STANDBY button
⑤ Channel select button (Up/Down)
④ PRESET button
⑥ SEARCH button

***DV-90G/W**

The tuner built in this VTR is capable of receiving V_L channels E2 to E4, X, Y, Z and V_H channels E5 to E12, S1 to S20 and UHF channels 21 to 69.

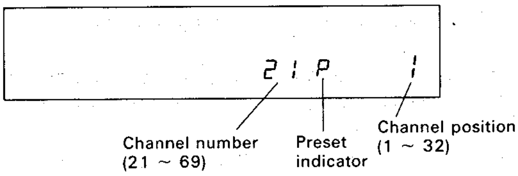
***DV-90T**

The tuner built in this VTR is capable of receiving V_L channels A, B, C, X, Y, Z and V_H channels D to H_1, H_2, S1 to S20 and UHF channels 21 to 69.

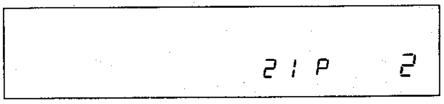
Channels may be memorized in channel positions 1 to 32. When selecting a UHF/VHF station or changing to a preferred order, carry out the operation in numerical order as follows.

Example: Setting UHF station (ex. 26ch) in position 2

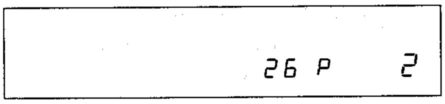
1. Turn on the power switch ① of the TV and set the VTR output channel on the TV channel selector ②.
2. Press the ON/STANDBY button ③ to ON (Light ON).
3. Open the door of the VTR front side.
4. Press the PRESET button ④.


21 P 1
Channel number (21 ~ 69)
Preset indicator
Channel position (1 ~ 32)

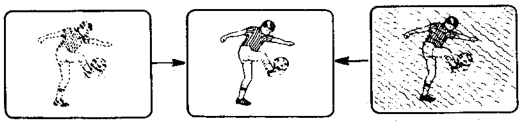
5. Set the channel position to be preset using channel select buttons (up/down) ⑤ or the 10 key on the remote control unit. .... "2"



6. Set the channel you wish to tune in.
   There will be two cases:
   (a) When you do not know the channel number you want to tune in:
   Press the SEARCH button ⑥.
   The channel will be up by one from lower channel 21. If the received signal is tuned in, scanning operation stops automatically.
   If the scanned channel is not that one you want to store into the tuned memory, press the SEARCH button ⑥ to restart channel search operation.
   (b) When you do know the channel number you want to tune in:
   Select the channel number using the 10's and 1's buttons ⑦.

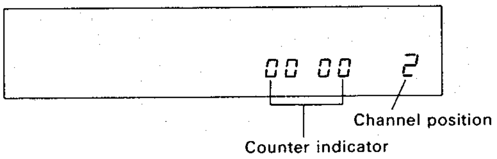


7. Make fine adjustment using the FINE (+)/(−) buttons ⑧.

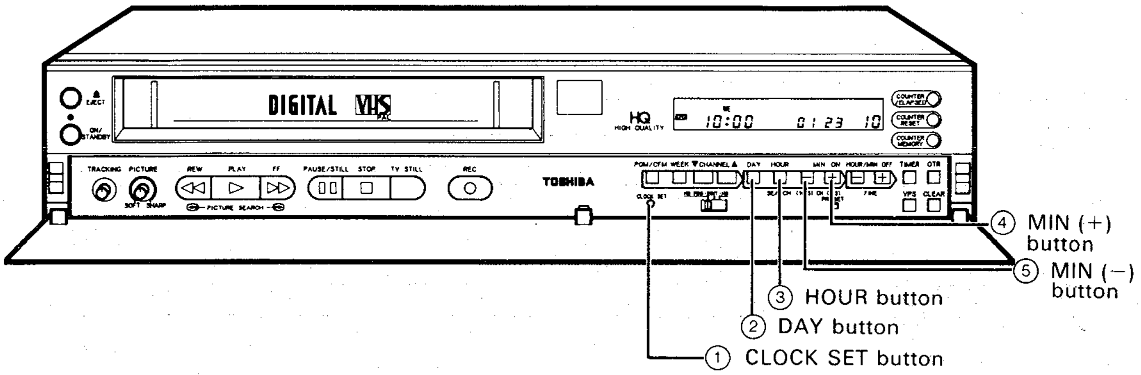


Press the "+" button until colour appears. Best picture Press the "−" button until the stripes disappear.

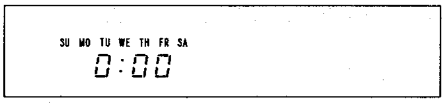
8. Repeat steps 5 to 7 (up to 32 positions).
9. Press the PRESET button ④. When the button is pressed, the display enters the counter mode showing only channel position number.


00 00 2
Channel position
Counter indicator

SETTING THE VTR CLOCK

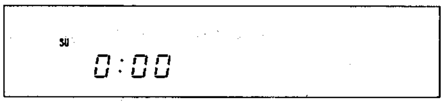

DIGITAL VHS
TOSHIBA
HQ
10:00
④ MIN (+) button
⑤ MIN (−) button
③ HOUR button
② DAY button
① CLOCK SET button

When the power lead is first connected to the AC outlet, or after an interruption of the power supply, the indication SU...SA 0:00 appears, flashing on the display as shown.

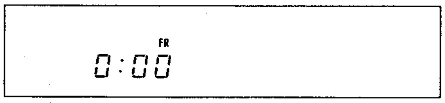

SU MO TU WE TH FR SA
0:00

Example: To set for FR 19:25 (Friday, 19:25)

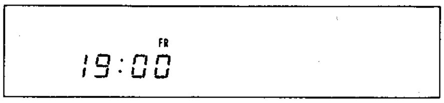
1. Press the CLOCK SET button ① to set the unit to the clock set mode.



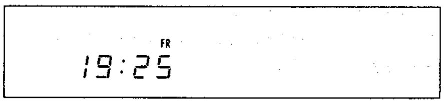
2. Press the DAY button ② to set the day of the week .... "FR"



3. Press the HOUR button ③ to set the hour digits .... "19"



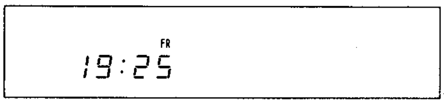
4. Press the MIN (+) button ④ to set the minute digits .... "25"



Notes:

1. When the button is pressed once, the digit advances by one. When the button is kept pressed down, the minutes advance rapidly.
2. If you pass the desired time by mistake, use the MIN (−) button ⑤ to turn back the minutes.

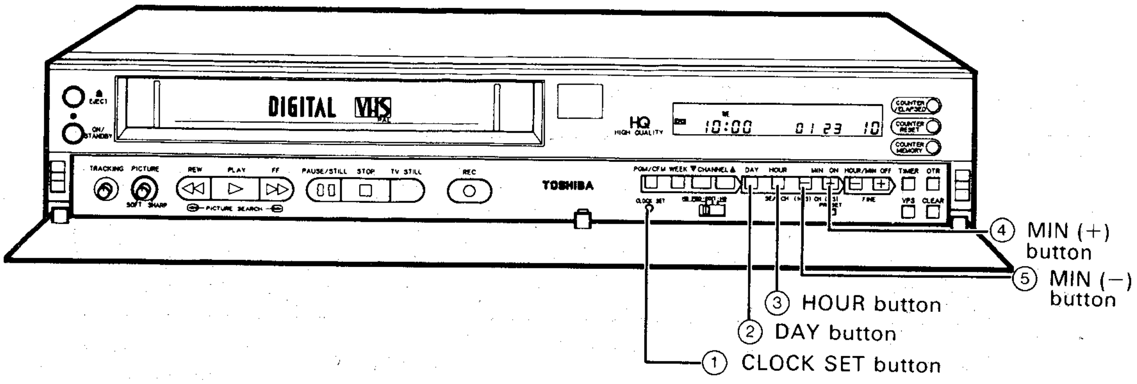
5. Press the CLOCK SET button to display the current time. When the button is pressed, the clock starts from zero seconds.
   To synchronized the clock with the radio time signal, press the CLOCK SET button ① on the last pip of the hourly time signal.



Notes:

1. Be sure to set the current time before doing "TIMER RECORDING".
2. After power interruption, the fluorescent display changes in two ways: the colon (:) flashes, and the indication SU...SA 0:00 flashes. In former case, press the CLOCK SET button ① twice. In the latter case, reset the VTR clock to the current time and reset the programming data for the timer recording.

SETTING THE VTR CLOCK



When the power lead is first connected to the AC outlet, or after an interruption of the power supply, the indication SU...SA 0:00 appears, flashing on the display as shown.

SU MO TU WE TH FR SA
0:00

Example: To set for FR 19:25 (Friday, 19:25)

1. Press the CLOCK SET button ① to set the unit to the clock set mode.

SU
0:00

2. Press the DAY button ② to set the day of the week .... "FR"

FR
0:00

3. Press the HOUR button ③ to set the hour digits .... "19"

FR
19:00

4. Press the MIN (+) button ④ to set the minute digits .... "25"

FR
19:25

Notes:

1. When the button is pressed once, the digit advances by one. When the button is kept pressed down, the minutes advance rapidly.
2. If you pass the desired time by mistake, use the MIN (−) button ⑤ to turn back the minutes.

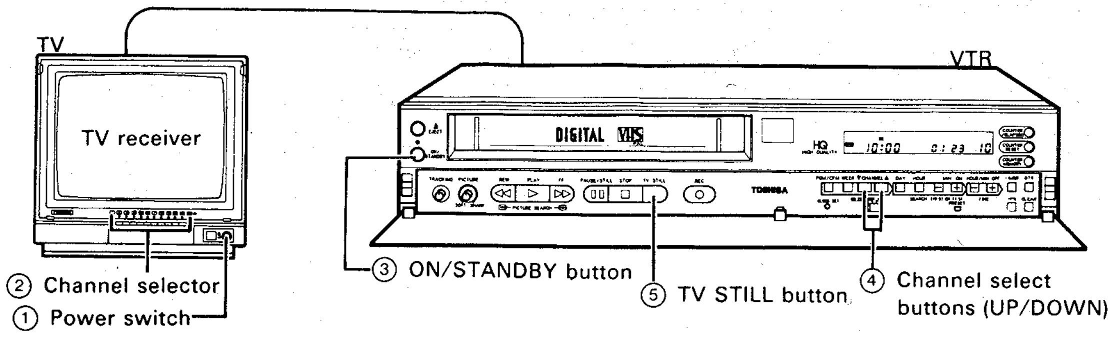
5. Press the CLOCK SET button to display the current time. When the button is pressed, the clock starts from zero seconds.
   To synchronized the clock with the radio time signal, press the CLOCK SET button ① on the last pip of the hourly time signal.

FR
19:25

Notes:

1. Be sure to set the current time before doing "TIMER RECORDING".
2. After power interruption, the fluorescent display changes in two ways: the colon (:) flashes, and the indication SU...SA 0:00 flashes. In former case, press the CLOCK SET button ① twice. In the latter case, reset the VTR clock to the current time and reset the programming data for the timer recording.

TV VIEWING


TV
TV receiver
VTR
DIGITAL VHS
② Channel selector
① Power switch
③ ON/STANDBY button
⑤ TV STILL button
④ Channel select buttons (UP/DOWN)

NORMAL TV VIEWING

Two types of normal TV viewing are possible when the VTR is connected to the VTR.

Using the TV tuner

1. Turn on your TV power switch ①.
2. Select the desired channel with the channel selector ② on the TV.

Note: It is not necessary to turn the VTR on in this case.

Using the VTR tuner

1. Press the ON/STANDBY button ③ of the VTR.
2. Set the TV channel selector ② to the VTR output channel.
3. Select the desired channel with the channel select buttons (UP/DOWN) ④ on the VTR or the Remote Control Unit.

TV STILL VIEWING

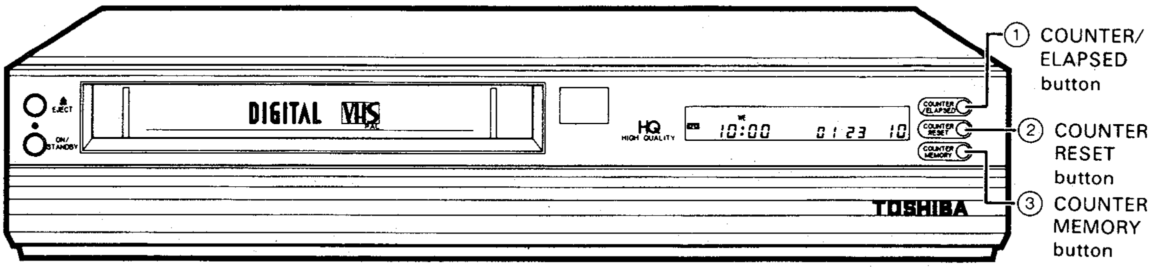
When using a TV to view picture from the video tuner or line input, pressing the TV STILL button stops the TV picture.

1. Press the ON/STANDBY button ③.
2. Set the TV channel selector ② to the VTR output channel.
3. Press the channel select buttons (UP/DOWN) ④ of the VTR to select the desired channel.
4. Press the TV STILL button ⑤ to stop the picture, and a TV STILL picture will appear.

Note: Sound is output while you view a TV STILL picture on the TV screen.

5. Press the TV STILL button ⑤ again to release the TV STILL picture.

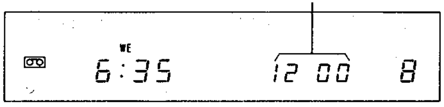
TAPE COUNTER


DIGITAL VHS
EJECT
ON/STANDBY
HQ HIGH QUALITY
10:00
0 1 23
TOSHIBA
① COUNTER/ ELAPSED button
② COUNTER RESET button
③ COUNTER MEMORY button

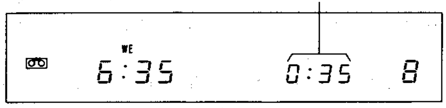
COUNTER/ELAPSED TIME OPERATION

The fluorescent display will either show the counter or the elapsed time when the COUNTER/ELAPSED button ① is pressed.

Counter display


WE
6:35
12 00
8

Elapsed time (ELAPSED) display

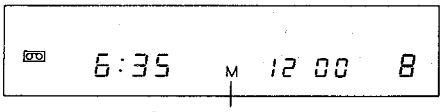


COUNTER RESETTING

At the beginning of the tape, press the COUNTER RESET button ②. This will set the counter to "0000". While recording or during playback, write down the programme recorded along with its corresponding counter numbers. Later, when using fast forward or rewind, you can easily find any sections desired.

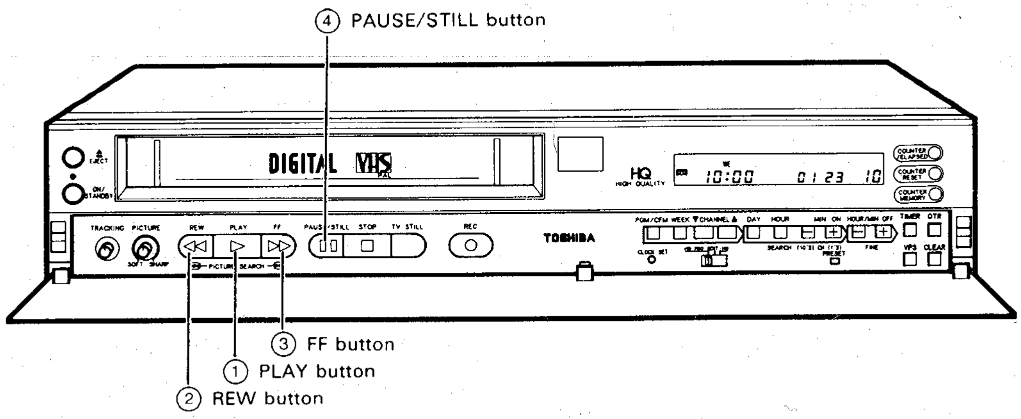
COUNTER MEMORY OPERATION

When the COUNTER MEMORY button ③ is pressed, the indicator "M" is displayed and the tape stops at a counter reading about "0000" during rewinding and fast forward modes. You now can return to the beginning of a recorded section quickly and easily.



Counter memory indication

SPECIALIZED PLAYBACK



PICTURE SEARCH

1. Press the PLAY button ①.
2. When the REW button ② or FF button ③ is pressed the picture moves quickly (about 7 times the normal speed) in reverse or forward direction, and you can search for desired parts of a programme.

Notes:

- During the picture search operation, a few noise bars will go up and down on the playback picture.
- During the picture search operation, if the picture flows vertically on the TV screen, adjust the V-HOLD knob on the TV set.
- During the picture search operation, the sound will be muted.

DIGITAL STILL PICTURE

1. Press the PLAY button ①.
2. To stop the tape momentarily or to watch a still picture during playback, press the PAUSE/STILL button ④.
3. Press the PAUSE/STILL button ④ again to release the still picture and return to normal playback.

Note:

The still mode will cease automatically after a lapse of approximately 5 minutes. The VTR will return to PLAY from STILL.

TWO TIMES SPEED PLAYBACK (AVAILABLE ONLY WITH THE REMOTE CONTROL UNIT)

Pressing the two times speed playback (× 2 ▶) button while in the playback mode, can perform the playback two times the normal playback. At this time, picture is reproduced without noise. And sound can be heard. (Sound is not reproduced as it is.)

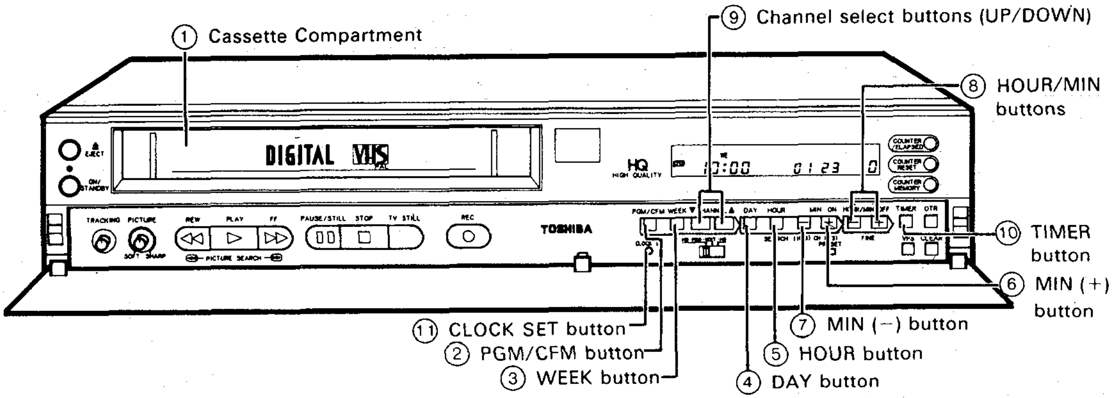
1. Press the "× 2 ▶" button on the remote control unit.
2. Press the PLAY button on the VTR unit or the remote control unit to return normal playback.

SLOW PLAY (AVAILABLE ONLY WITH THE REMOTE CONTROL UNIT)

Pressing the SLOW button permits you to play back the picture at 1/6 times the speed of the normal playback.

1. Press the PLAY button ① or PLAY button on the remote control unit.
2. Press the SLOW button on the remote control unit.
3. Press the PLAY button again to resume normal playback.

TIMER RECORDING

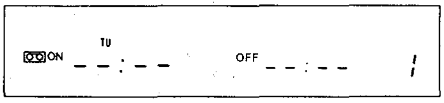

① Cassette Compartment
⑨ Channel select buttons (UP/DOWN)
⑧ HOUR/MIN buttons
⑩ TIMER button
⑥ MIN (+) button
⑪ CLOCK SET button
② PGM/CFM button
③ WEEK button
⑦ MIN (−) button
⑤ HOUR button
④ DAY button
DIGITAL VHS
HQ
TOSHIBA

The timer used in this VTR can preset four progrmmes for one day of the first week, one day of the next week, one day of the third week, the same day of every week, at the same time everyday.
The clock used is the 24-hour type. This VTR is capable of 21-day timer setting, and is designed to start timer recording when the TIMER button is pressed.
Five types of "day" setting are available in this VTR.

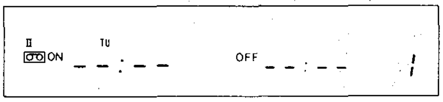
For example, if today is Tuesday, 7

SU (SUNDAY)	MO (MON-DAY)	TU (TUES-DAY)	WE (WEDNES-DAY)	TH (THURS-DAY)	FR (FRIDAY)	SA (SATUR-DAY)
			1	2	3	4
5	6	7	8	9	10	11
		◄—	1st week			
12	13	14	15	16	17	18
——	——►	◄—	Next week			
19	20	21	22	23	24	25
——	——►	◄—	Third week			
26	27	28	29	30	31	
——	——►					

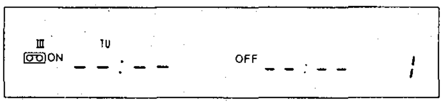
(1) 1st week "TU", 7th
(ineffective after execution)



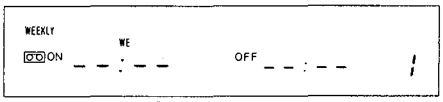
(2) Next week "II TU", 14th
(ineffective after execution)



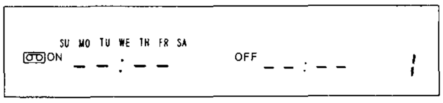
(3) Third week "III TU", 21st
(ineffective after execution)


III
TU
ON - - : - -
OFF - - : - -

(4) Weekly Wednesday "WEEKLY WE"
8
15
22
29
continues to the next month


WEEKLY
WE
ON - - : - -
OFF - - : - -

(5) Every day "SU, MO TU, WE, TH, FR, SA"


SU MO TU WE TH FR SA
ON - - : - -
OFF - - : - -

When the WEEK button is pressed, the WEEK indicator lights as follows:

II ——→ III
↑
WEEKLY ←

When the day button is pressed, the day display changes as follows:

→ TU → WE → TH → - - - - → MO
every day "SU. MO. TU. ----SA"

Note: The day display changes from the current time.

OPERATION

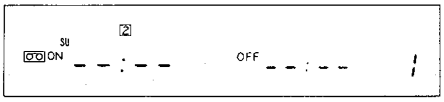
1. Confirm the current time. If the current time is not correct, reset the current time. (See page 11.)
2. Insert a cassette into the cassette compartment ①. (Check the cassette safety tab has not been removed.)
3. Specify the programme number (1 through 4) with the PGM/CFM button ②.
4. Press the WEEK button ③ if you want programmes for one day of the next week, one day of the third week or the same day of every week.

TIMER RECORDING

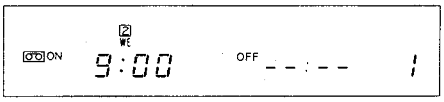
5. Set the day of the week with the DAY button ④.
6. Set the on time with the HOUR button ⑤, MIN (+) ⑥ and MIN (−) button ⑦.
7. Set the end time with the HOUR/MIN buttons ⑧.
   Notes:
   1. 10-minute-digit is automatically carried to one-hour-digit when 10-minute-digit is over 60 minutes by continuously pressing the (+) button of the HOUR/MIN buttons.
   2. Use the (−) button to put back the timer end time.
8. Select the programme you want to see with the channel select buttons ⑨.
9. To continue to preset the programmes, repeat steps 3 to 8.
10. Press the TIMER button ⑩.

Example: To preset channel 25 in programme 2 from 13:00 to 13:15 of the next week on Tuesday.
(Today is Wednesday at 9:00.)

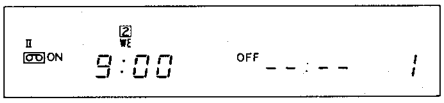
1. Press the PGM/CFM button ② to set "2" position.



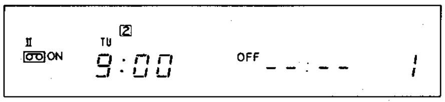
2. Press the WEEK button ③ once.
   (The current time will be shown in the display.)



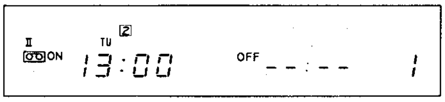
3. Press the WEEK button ③ again to display "II".



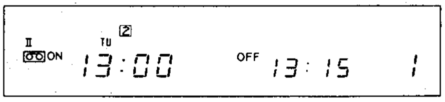
4. Press the DAY button ④ to set "II TU".



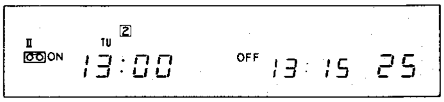
5. Press the HOUR button ⑤, MIN (+) ⑥ and MIN (−) ⑦ buttons to set the start time......................."13:00"



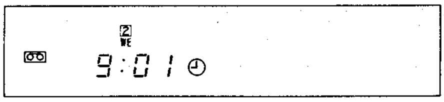
6. Press the HOUR/MIN buttons ⑧ to set the end time..."13:15"



7. Press the channel select button ⑨ to select the desired channel.. 25
   (In this case, you can directly select the desired channel with the remote control unit.)



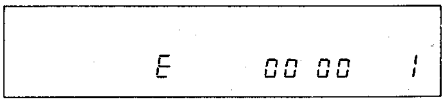
8. Press the TIMER button ⑩.



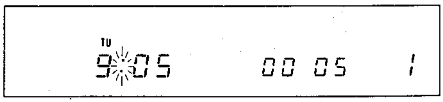
(The VTR clock works during timer setting.)

Notes:

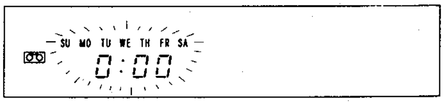
1. When no cassette is loaded, timer recording is not possible.
   In this case, the "E" indicator is displayed while the TIMER button ⑩ is pressed.



2. If the cassette tab has been removed, timer recording is also not possible. At this time, the cassette is ejected automatically.
3. During timer recording, the preset contents (programme number, channel, day of the week or timer on/off time) cannot be changed.
4. The end time can be preset every 30 minutes with the OTR button.
5. Programme settings remain in effect until they are executed.
6. After a power interruption, the fluorescent display is as shown below.
   (1)

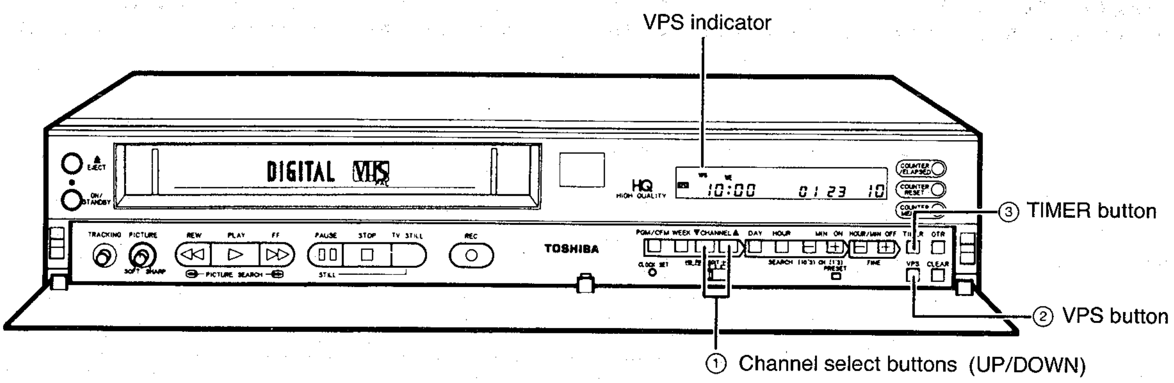


   In this case, the contents of the programmes remain in effect. Press the CLOCK SET button ⑪ to confirm the current time is correct. Press it again to set the current time.
   (2)



   In this case, the preset programmes become ineffective. Reset the VTR clock to the current time and do the programme setting from the beginning.
7. To proceed to another programme setting at step 7, press the PGM/CFM button ②.
8. Timer setting is possible even in standby mode.

VPS RECORDING (DV-90G)



What is VPS?

VPS is the abbreviation for Video Programme System and was created to fully record television programmes having VPS signals from start to end even if your desired television programme's start time is changed or rescheduled. This system is currently adopted in all areas of West Germany. The followings should be taken into consideration when making VPS timer programming.

1. Be sure to confirm the VPS television programmes are cast on air in your area.
2. Is your VPS signal received in your area weak?
3. This VTR is set to ON (VPS indicator lit) as for the VPS function. Before starting the VPS recording, be sure to confirm the VPS indicator is lit.
4. Ensure the VTR clock time is correct.
5. Preset the timer programming for your desired VPS television programme.

In case the VPS timer programming data and normal timer programming data are overlapped

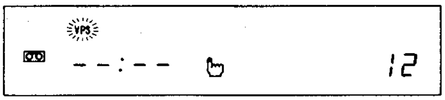
The VPS programming data always take priority over other timer programming data. If you want to preset a television programme at a time of which in the vieinity a VPS programme will be broadcast, press the VPS button to release the VPS function.

VPS One-Touch Timer Recording

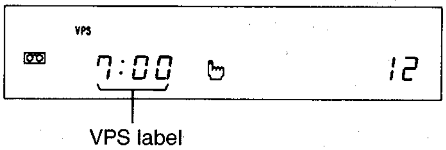
Example:

Today is Sunday, at 7:10 o'clock to record channel 12 for VPS recording.

1. Selected the desired channel with the channel select buttons (UP/DOWN) ① or the 10 keys on the remote control unit.
2. Press the VPS button ②.
   The following will be indicated on the display while the VPS signal is being detected.



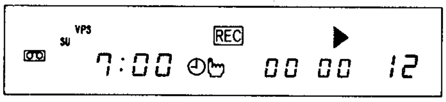
When the VPS is on, the display will be changed to:



Notes:

1. When the VPS signal is not detected and the VPS is off, the "E" mark will be shown in the display.
2. "7:00" shown in the fluorescent display is a VPS label for the TV programme being received.

3. Press the TIMER button ③within nine seconds after the VPS is switched on.

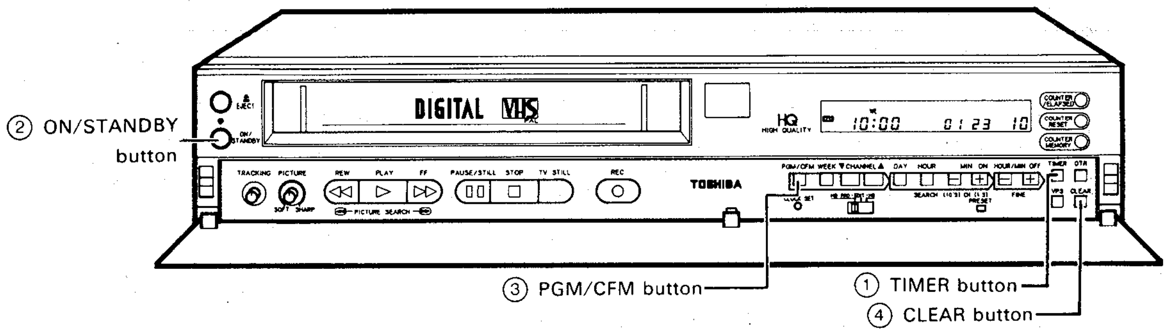


The VPS OTR then starts, and recording will be continued until the label for that programme stops sending.

Note:

Note that when you wish to perform VPS timer recording for several programmes, the timer preset function will not handle the other programmes in the memory until recording of the programme which is being recorded first is completed. Because, of this, when timer recording times overlap, the programme that was preset first takes priority over the others.

ADDITIONAL INFORMATION FOR TIMER RECORDING


② ON/STANDBY button
DIGITAL VHS
HQ
TOSHIBA
③ PGM/CFM button
① TIMER button
④ CLEAR button

TO USE THE VTR AFTER SETTING THE PROGRAMMABLE TIMER

1. Press the TIMER button ① to release the timer mode.
2. Press the ON/STANDBY button ② to turn on the VTR.
3. After use, be sure to press the PGM/CFM button ③ to verify the contents of the stored programmes.
4. To enter the timer mode again, press the TIMER button ①.

TO CANCEL THE TIMER PROGRAMME

1. Press the PGM/CFM button ③ to display the programme number to be cancelled.
2. Press the CLEAR button ④. The timer off time and channel are also erased.

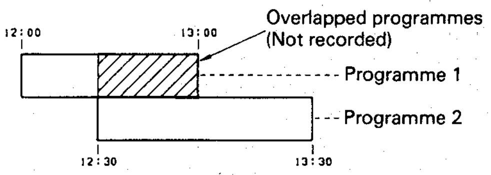
TO CHECK THE TIMER PROGRAMME

It is very useful to make a schedule for timer programmes so that you can know the contents of the stored programmes. The following method is available to check the data preset in the timer programme.

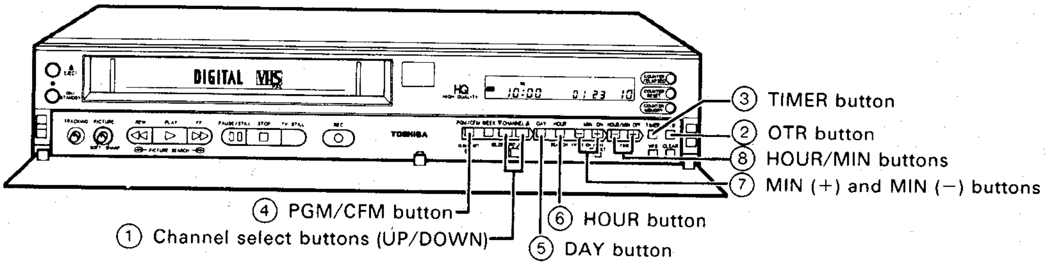
1. Press the PGM/CFM button ③.
   The contents of the programmes 1 through 4 (start time and end time) that were previously stored, will be displayed on the fluorescent display continuously.

PROGRAMME OVERLAPPING

Be careful not to overlap the preset times.
If you happen to overlap the preset programmes, start time has priority in execution, and the overlapped programme will not be recorded. See figure below.


Overlapped programmes
(Not recorded)
12:00
13:00
Programme 1
Programme 2
12:30
13:30

ONE TOUCH TIMER RECORDING

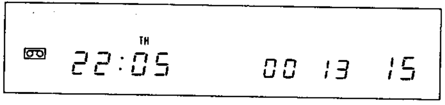

DIGITAL VHS
HQ
TOSHIBA
③ TIMER button
② OTR button
⑧ HOUR/MIN buttons
⑦ MIN (+) and MIN (−) buttons
④ PGM/CFM button
① Channel select buttons (UP/DOWN)
⑥ HOUR button
⑤ DAY button

This VTR unit features a one touch recording (OTR) function. This function allows you to record at 30 minute periods, for up to 4 hours.
After the recording is completed, the power goes off automatically.
Also, when setting the timer, the off time can be set at 30 minute periods. The One Touch Recording (OTR) mode takes priority over other VTR operation modes. For example, when the OTR mode is activated while the VTR is in the timer mode, the VTR will automatically return to the timer mode after the OTR mode is completed. Thus, it is possible to have 5 different timer recordings.

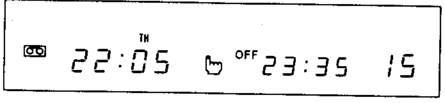
OTR OPERATION

Example: To record channel 15 starting from now for 1-1/2 hours at a current time on Thursday, 22:05

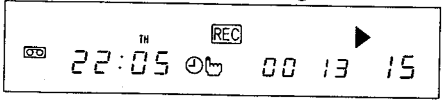
1. Select channel 15 by pressing channel select buttons (up/down) ①.


TH
22:05
00 13 15

2. Press the OTR button ② to set the recording time.
   When the OTR button ② is pressed once: 22:35 (30 minutes)
   When the OTR button ② is pressed twice: 23:05 (1 hour)
   When the OTR button ② is pressed three times: 23:35 (1 hour and 30 minutes)


TH
22:05
OFF 23:35
15

3. Press the TIMER button ③ within 9 seconds.


TH
REC
22:05
00 13 15

Notes:

1. Thirty minutes are added every time the OTR button ② is pressed, for up to 4 hours (eight times). (The one touch timer can only be set in 30-minute units.)
2. One touch timer operation impossible only when power is on and the VTR is in the clock mode.
3. The one touch timer function has priority over any other operation function (play back, recording, timer, etc.)

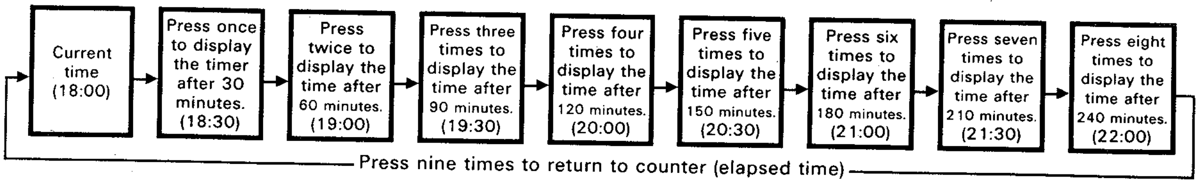
TO SET THE TIMER OFF TIME WITH THE OTR BUTTON

Example: To set channel 18 starting from Saturday, 20:02 for 1 hour to programme 1 at a current time of Tuesday, 8:21

1. Confirm the current time. If the current time is not correct, set the current time again (see page 11).
2. Insert a cassette into the compartment. (Check the cassette safety tab has not been removed).
3. Specify the programme number (1 through 4) with the PGM/CFM button ④................................"PGM 1"
4. Set the day of the week with the DAY button ⑤.."SA"
5. Set the recording start time with the HOUR button ⑥ and MIN (+) and MIN (−) buttons ⑦ to 20:02.
6. Press the OTR button ② three times.
7. Select the desired channel 18 with the channel select buttons (up/down) ① or use the remote control unit to directly select the desired channel.
8. Press the TIMER button ③ to complete the timer setting.
9. The "TIMER" indicator lights.

Error indication

When the TIMER button ③ is pressed without setting timer on/off time, or without a cassette in the compartment, the "E" indicator lights (while the TIMER button ③ is pressed).


Current time (18:00)
Press once to display the timer after 30 minutes. (18:30)
Press twice to display the time after 60 minutes. (19:00)
Press three times to display the time after 90 minutes. (19:30)
Press four times to display the time after 120 minutes. (20:00)
Press five times to display the time after 150 minutes. (20:30)
Press six times to display the time after 180 minutes. (21:00)
Press seven times to display the time after 210 minutes. (21:30)
Press eight times to display the time after 240 minutes. (22:00)
Press nine times to return to counter (elapsed time)

CIRCUIT DESCRIPTIONS

1. Servo Circuit

1-1. Outline

A new digital servo IC (TD6361N-C5) which plays central roles in the servo operation is employed in the servo circuit. The servo IC includes:

1. Cylinder servo circuit which controls speed and phase of video heads.
2. Capstan servo circuit which controls tape speed at a specified value, thereby allowing the video heads to precisely trace video tracks.
3. Tracking switching circuit used in the slow playback and double speed playback operations.
4. V-sync separation circuit, various amplifiers, Schmitt circuits.
5. Synchronous editing circuit.
6. Pseudo V-sync signal generation circuit.

1-2. Servo IC

The servo IC TD6361N-C5 is a 42-pin, shrink type IC developed for VHS format VTRs and has following functions:

1. Cylinder system process circuits:
   Phase detection, speed detection, reference signal generation circuits.
2. Capstan system process circuits:
   Phase detection, speed detection, reference signal generation circuits. Mixing amplifier with loop gain automatic correction circuit.
3. Capstan speed control circuit for playbacks in slow, double speed, and 7 times speed mode, and cylinder fH correction circuit.
4. Schmitt amplifiers for PGs
5. Control signal recording current source
6. Pseudo V-sync signal generation circuit.
7. Synchronous editing function
8. Reference signal generation circuit

The TD6361N-C5 differs from the conventional servo IC TD6360P in that:
The mixing amplifier loop gain automatic correction circuit is added and mode designation is conducted by parallel data inputs through pins 28 to 33.
Table 1-1 shows the mode designation.

Table 1-1 Servo IC mode table

Pin No.	**28**	**29**	**30**	**31**	**32**	**33**
Pin Name	**VP ON**	**M1**	**M2**	**REV/ FWD**	**S1**	**S2**
REC	L	H	L	L	L	L
SYNC. EDITING	L	H	H	L	L	L
PLAY	L	L	H	L	L	L
x 2	H	L	H	L	H	L
CUE	H	L	H	L	L	H
REV	H	L	H	H	L	H
SLOW	M	L	H	L	L	L

H: HIGH voltage level (5V)
L: LOW voltage level (0V)
M: MIDDLE voltage level (2.5V)

1-3. Cylinder servo circuit

The cylinder servo circuit is provided to precisely record video signals on specified track patterns in the record mode, and to trace the recorded patterns correctly in the playback mode by controlling revolution speed and revolution phase of the video heads.

1-3-1. PG/SW pulse generation circuit

1. The PG pulses are generated by detecting revolution of PG magnets mounted under the cylinder with fixed PG heads. Location of the PG pulses is set so that it precedes approx. 1.7ms from a head switching point when the servo is locked. Fig. 1-1 shows a block diagram of the servo circuit and Fig. 1-2 indicates a timing chart.

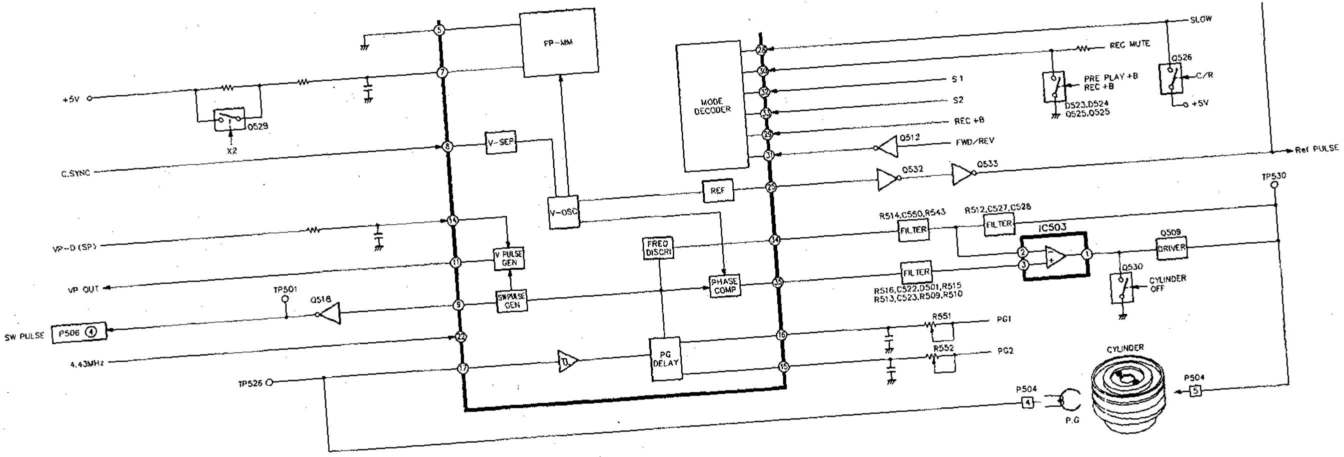

+5V
Q529
X2
C.SYNC
VP-D (SP)
VP OUT
TP501
Q518
SW PULSE
P506 ④
4.43MHz
TP526
⑤
⑦
⑧
⑭
⑪
⑨
㉒
⑰
FP-MM
V-SEP
V-OSC
V PULSE GEN
SW PULSE GEN
FREQ DISCRI
PHASE COMP
PG DELAY
REF
MODE DECODER
㉘
㉚
㉜
㉝
㉙
㉛
㉕
㉞
㉟
⑯
⑮
SLOW
REC MUTE
S1
S2
REC +B
FWD/REV
Q512
Q532
Q533
PRE PLAY +B
REC +B
D523,D524
Q525,Q525
Q526
C/R
+5V
Ref PULSE
TP530
R514,C550,R543
FILTER
R512,C527,C528
FILTER
IC503
R516,C522,D501,R515
R513,C523,R509,R510
FILTER
Q509
DRIVER
Q530
CYLINDER OFF
R551
PG1
R552
PG2
CYLINDER
P504
P.G

Fig. 1-1 Cylinder servo block diagram

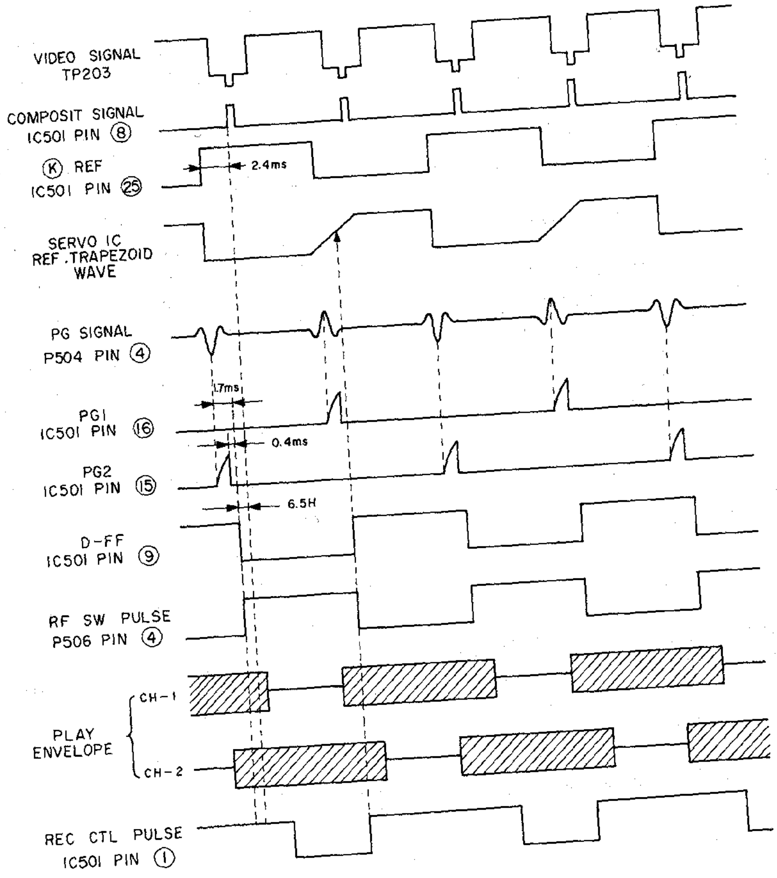

VIDEO SIGNAL
TP203
COMPOSIT SIGNAL
IC501 PIN ⑧
Ⓚ REF
IC501 PIN ㉕
2.4ms
SERVO IC
REF. TRAPEZOID
WAVE
PG SIGNAL
P504 PIN ④
1.7ms
PG1
IC501 PIN ⑯
0.4ms
PG2
IC501 PIN ⑮
6.5H
D-FF
IC501 PIN ⑨
RF SW PULSE
P506 PIN ④
CH-1
PLAY
ENVELOPE
CH-2
REC CTL PULSE
IC501 PIN ①

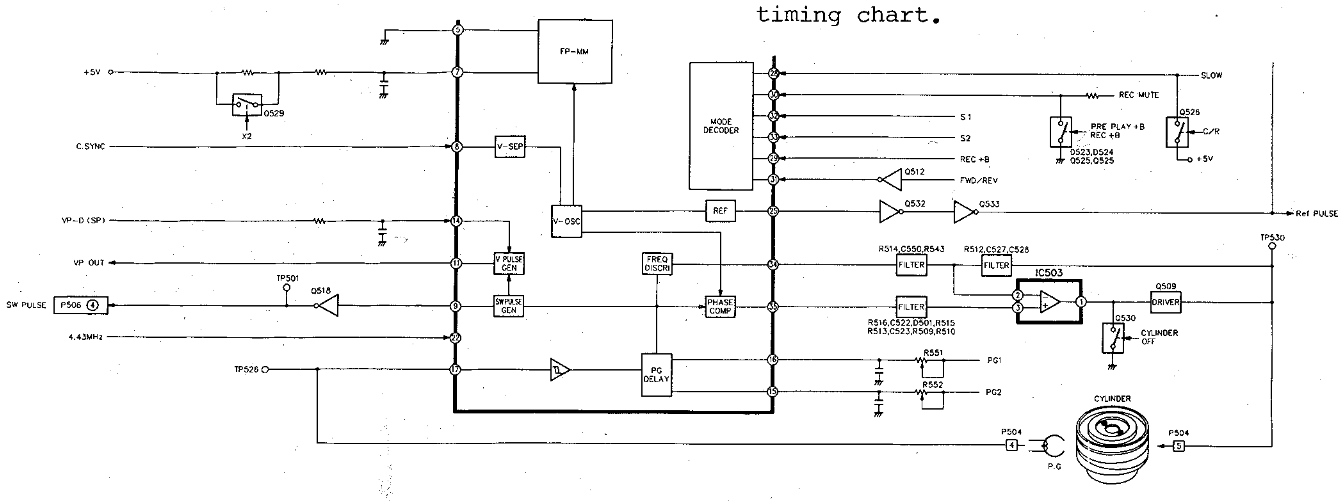
Fig. 1-2 Cylinder servo timing chart

1-3. Cylinder servo circuit

The cylinder servo circuit is provided to precisely record video signals on specified track patterns in the record mode, and to trace the recorded patterns correctly in the playback mode by controlling revolution speed and revolution phase of the video heads.

1-3-1. PG/SW pulse generation circuit

1. The PG pulses are generated by detecting revolution of PG magnets mounted under the cylinder with fixed PG heads. Location of the PG pulses is set so that it precedes approx. 1.7ms from a head switching point when the servo is locked. Fig. 1-1 shows a block diagram of the servo circuit and Fig. 1-2 indicates a timing chart.



FP-MM
+5V
Q529
X2
C.SYNC
V-SEP
VP-D (SP)
VP OUT
V PULSE GEN
TP501
Q518
SW PULSE
P506 ④
SW PULSE GEN
4.43MHz
TP526
V-OSC
FREQ DISCRI
PHASE COMP
PG DELAY
MODE DECODER
REF
SLOW
REC MUTE
S1
S2
REC +B
FWD/REV
Q512
PRE PLAY +B
REC +B
D523,D524
Q525,Q525
Q526
C/R
+5V
Q532
Q533
Ref PULSE
TP530
R514,C550,R543
FILTER
R512,C527,C528
FILTER
IC503
FILTER
R516,C522,D501,R515
R513,C523,R509,R510
Q509
DRIVER
Q530
CYLINDER OFF
R551
PG1
R552
PG2
CYLINDER
P504
P.G
P504

Fig. 1-1 Cylinder servo block diagram

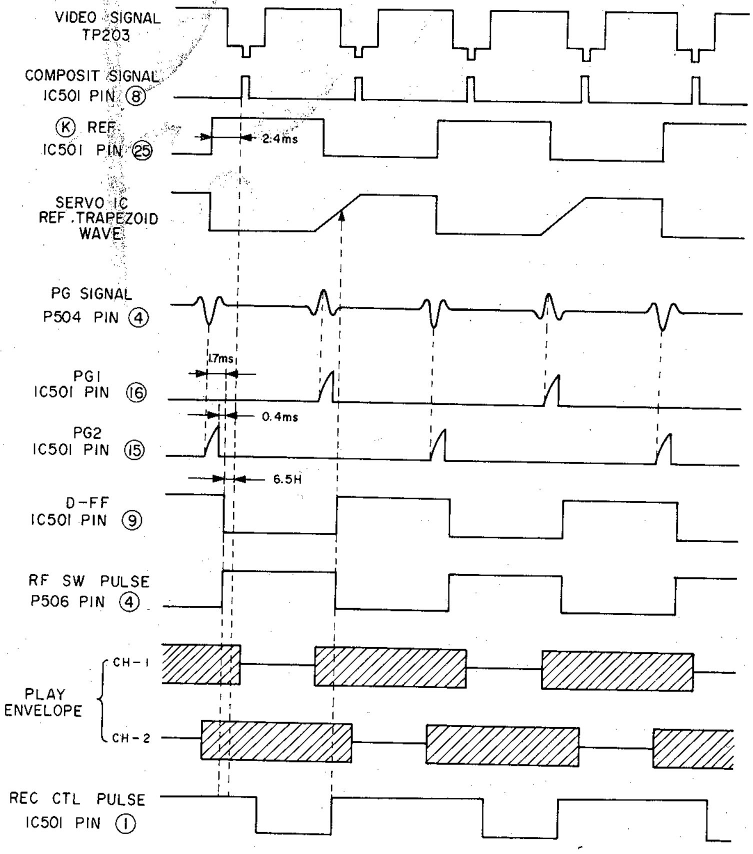


Fig. 1-2 Cylinder servo timing chart

2. A PG signal induced on a PG head enters pin 17 of IC501 through C530. Pin 17 of IC501 is biased with a voltage of approx. 2.25V. The PG signal is delayed by a time constant circuit (R551, R531, C504 for PG1, R552, R532, C503 for PG2) external IC501. With the delayed PG signal, a flip-flop inside the IC is triggered and the flip-flop develops switching pulse at pin 9 of IC501. The switching pulse is fed to the video circuit through Q518 inverter circuit. Amount of delay for the PG signal is set to 0.4ms (provided inside the IC) plus time constant provided by external time constant circuit.

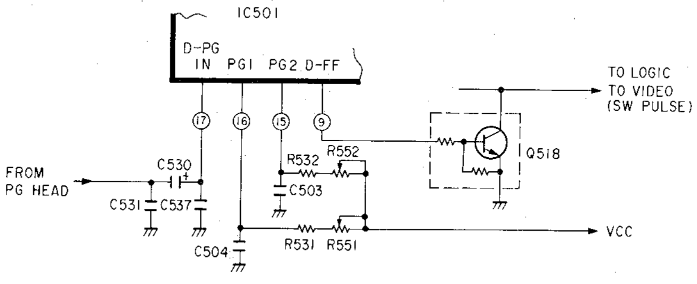


Fig. 1-3

1-3-2. Phase detection (APC) and speed detection (AFC) circuits

1. Phase and speed detections are performed inside IC501. In the phase detection circuit, phase at rising part of the switching pulse developed from the PG pulse stated above and phase of the reference signal(25 Hz signal) are compared.
2. In the record mode a V-sync signal entered pin 8 of IC501 is counted down to 1/2 and this is used as the reference signal. On the other hand, in the playback mode, 4.43 MHz clock signal entered pin 22 of IC501 is counted down to 25 Hz and this is used as the reference signal. This is the only difference between the record and playback modes in the cylinder servo circuit.
3. In the speed detection circuit, time difference comparison (speed comparison) is carried out between rising and falling edges of the switching pulses. Each of phase and speed detection output is subject to pulse width modulation (PWM) of approx. 35 KHz and outputs from pins 35 and 34 of IC501 as a PWM square wave pulse.
4. When the servo circuit is in locked, stable condition, the PWM pulse has approx. 50% duty. While the stable condition is upset and speed is varying, the duty deviates excessively. And in the worst case the output shows high or low level. However, the APC output at pin 35 of IC501 develops 50% duty pulse if the speed deviates excessively and the AFC shows high or low level.

1-3-3. Phase compensation and output amplifier circuits

1. The APC output developed at pin 35 of IC501 passes through a filter and phase compensation circuits (R516, C522, R515, R513, C523, R509, R510) provided to stabilize the servo characteristics and to smooth PWM carrier (35kHz) and enters pin 3 of IC503 op-amplifier. A bi-directional diode (D501) connected in parallel with R515 functions to speed up the response by rapidly charging or discharging C523.
2. On the other hand, the AFC output from pin 34 of IC501 enters a filter circuit (R514, C550, R543) which removes PWM carrier components, and the filter output enters pin 2 of IC503. The carrier components in the AFC output is attenuated by a feedback capacitor C528 connected to pin 2 of IC503. R512 and C527 determines gain of the op-amplifier as well as operate as an APC and AFC filter.
3. The op-amplifier output enters the base of Q509 drive transistor and drives the cylinder motor. The cylinder is stopped as follows:
The logic microcomputer develops a cylinder OFF signal (HIGH) at its pin 27 of IC601 and Q530 turns ON, lowering the base bias of Q509 LOW.

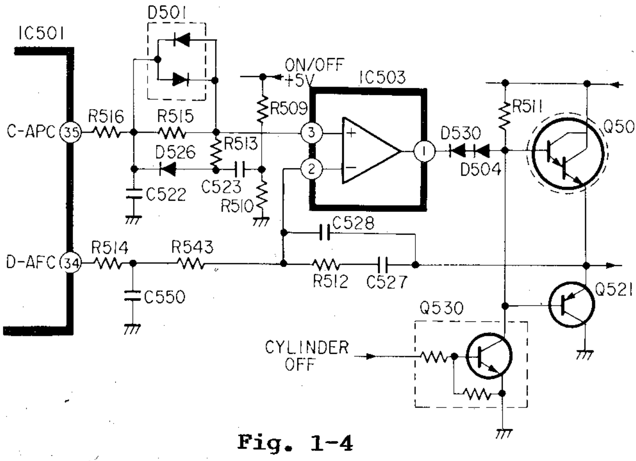


Fig. 1-4

1-3-4. fH correction circuit

1. In the slow, double speed, and cue/review modes, tape speed varies. Accordingly, it is necessary to control revolution speed of the cylinder to obtain horizontal sync signal frequency (fH) of 15.625 KHz by maintaining relative tape speed at a specified value between the cylinder and the tape.
2. The servo IC TD6361N-C5 automatically increases or decreases the cylinder speed depending upon the tape speed in the slow, double speed, cue/review modes, thus performing the fH correction.

1-4. Capstan servo circuit

1. A purpose of the capstan servo circuit is to control tape speed from 1/6 slow to Cue/Review modes of operations. A direct drive motor is used as a capstan motor.
2. Fig. 1-5 shows a block diagram of the capstan servo circuit and Fig. 1-6 and Fig. 1-7 show timing charts.

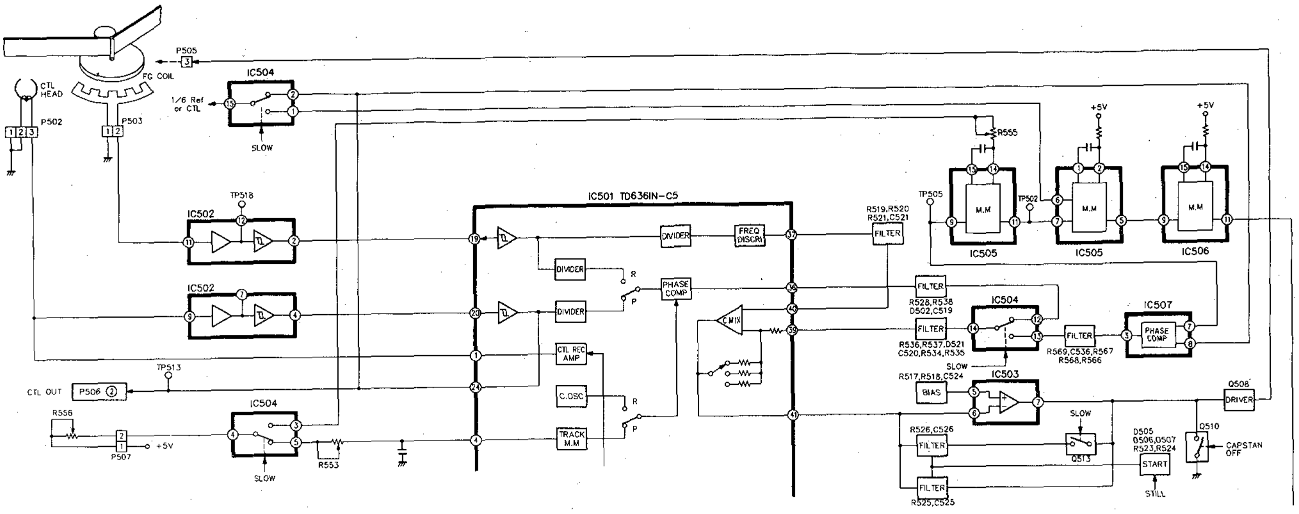

P505
CTL HEAD
FG COIL
P502
P503
IC504
1/6 Ref or CTL
SLOW
TP518
IC502
IC501 TD636IN-C5
DIVIDER
FREQ DISCRI
PHASE COMP
R
P
C MIX
CTL REC AMP
C.OSC
TRACK M.M
TP513
CTL OUT
P506 ②
R556
P507
+5V
R553
R519,R520
R521,C521
FILTER
TP505
TP502
R555
M.M
IC505
IC506
R528,R538
D502,C519
R536,R537,D521
C520,R534,R535
IC507
R569,C536,R567
R568,R566
R517,R518,C524
BIAS
IC503
Q508
DRIVER
R526,C526
Q513
D505
D506,D507
R523,R524
START
STILL
Q510
CAPSTAN OFF
R525,C525

Fig. 1-5 Capstan servo block diagram

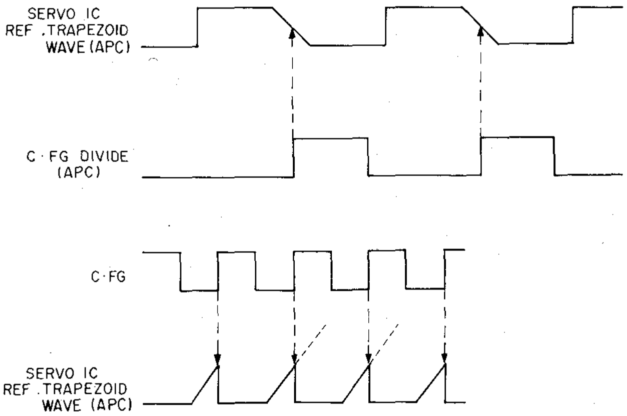


Fig. 1-6 Capstan servo timing chart
(Record mode)

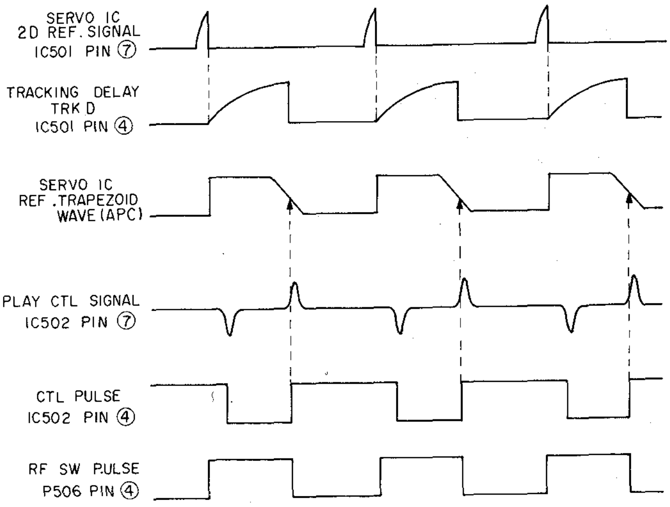


Fig. 1-7 Capstan servo timing chart
(Playback mode)

1-4-1. FG pulse generator, FG amplifier, FG Schmitt circuit

1. The capstan motor is always generating FG pulses as a speed feedback signal for capstan control. FG magnets mounted on outside the motor rotates as the motor rotates and pass away pattern coils on a PC board which is mounted closely to the magnets. In this case the pattern coils develop voltages and the voltages are used as the FG pulses.
2. The FG pulses induced on the coils enter the servo circuit through pin 1 of P503. Number of the FG pulses is 240 pulses per one revolution of the motor or 504 Hz in normal playback and record modes with the servo circuit locked.
3. The FG pulses are amplified, waveshaped by IC502 (FG-CTL AMPIC) and then applied to pin 19 of IC501.

1-4-2. Speed detection (inside IC501)

1. The FG pulses entered pin 19 of IC501 are subject to speed comparison (AFC) in the speed detection circuit, and the resultant output is developed at pin 37 as an approx. 35 KHz PWM (Pulse Width Modulation) square wave signal. The AFC sampling frequency in this case is 504 Hz.
2. Generally speaking, since the capstan system is more subject to external disturbance, the AFC output shows relatively large duty variation if the servo is locked.

1-4-3. Phase detection (Inside IC501)

(1) Record mode

The FG pulses entered pin 19 of IC501 are counted down to 1/20 or 25.2 Hz and compared with a reference signal in time difference (phase detection) in the phase comparator circuit, and the resultant output is obtained at pin 36 as an approx. 35 KHz PWM (Pulse Width Modulation) square wave signal. In this case, the reference signal is 25.2 Hz developed inside the IC for exclusive use of the capstan control system.

(2) Playback mode

In the playback mode, a signal delayed by a time equivalent to a time constant determined by the main tracking resistor R556, subtracking resistor R553, and C518 from falling edge of the reference signal (2D's delayed signal at pin 7 of IC501) used as the reference signal for the cylinder phase detection is used as the reference signal. The reference signal and the CTL signal entered are compared in time difference (phase detection), and outputs as a PWM output at pin 36. Forcing the duty to 50% is also takes place as in the cylinder control for both record and playback operations when the servo is out of lock.

1-4-4. Phase compensation filter, mixing amplifier, and output amplifier circuits

1. The APC output at pin 36 of IC501 passes through a phase compensation filter and a smoothing circuit consisting of R528, C519, R538, R537, C520, R534, and R536, and enters pin 40 of IC501. The bidirectional diode D502 connected in parallel with R538 functions to speed up charging and discharging C519 to improve response of the circuit.

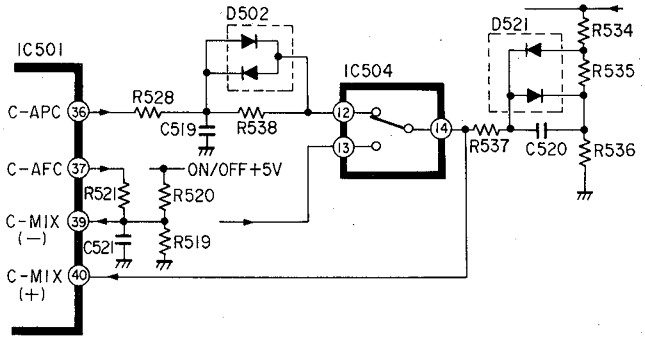


Fig. 1-8

2. The AFC output at pin 37 of IC501 is smoothed by R521, R519, R520, and C521, and then enters pin 39 of IC501. Inside the IC501, the AFC output is differentially amplified and performed APC. Pins 39, 40, 41 of IC501 operates as a loop gain automatic compensated mixing amplifier, and switches the circuit gain depending upon operation mode such as Cue/Review, etc.
3. The mixed and gain compensated signal of the APC and AFC signals develops at pin 41 of IC501 and enters pin 6 of IC503. Next, the signal is compensated by a filter consisting of C525 and R525, and then fed to Q508 drive transistor which drives the capstan motor.
4. D505, D507, and R523 are provided to improve starting characteristic of the motor by giving a fixed bias to C525 when the motor stops. D506 and R524 operate in the slow playback mode. In the slow mode, a filter consisting of R526 and C526 is also added.
5. The start and stop operations of the capstan motor is carried out by Q510 switch. The capstan motor stops when CAP OFF signal, pin 15 of IC601 logic microcomputer develops HIGH. Moreover, forward and reverse control of the capstan motor is performed by CAP F/R signal entered pin 2 of P505 transferred from pin 16 of IC601 logic microcomputer. That is, when the signal is HIGH, the motor rotates in forward and LOW in reverse direction.

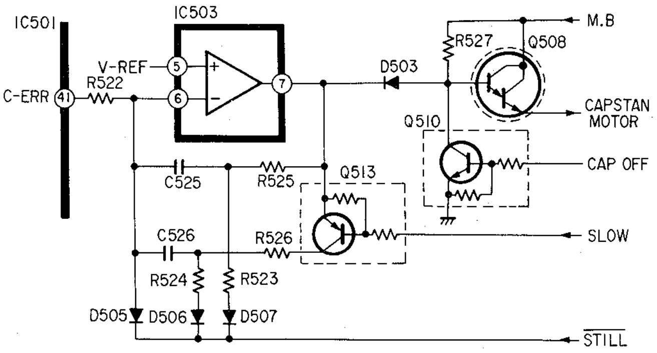


Fig. 1-9

1-4-5. Control (CTL) signal recording

In the record mode, a V-sync signal enters pin 8 of IC501 and a 25 Hz signal is developed from the sync signal. A recording current flows from pin 1 of IC501 into the control head and the current records up to a saturation level on the control track. The recording current is adjusted at approx. 3mAp-p with R542. Duty of the record control pulse is set to approx. 60% inside IC501.

1-4-6. Playback control signal, Schmitt circuit

The playback control signal is amplified and waveshaped by IC502 (FG-CTL amplifier IC) and then enters pin 20 of IC501.
In the slow mode, Q531 operates to perform gain switching.

1-4-7. Cue/Review

The Cue/Review operation with fixed noise bars are achieved by rotating the capstan motor at high speed and controlling rotational phase and speed of the motor. When the cue/review (7 times the normal speed) mode is set at pins 28 to 33 of the servo IC, CTL and FG pulses entered the IC are counted down to 1/7 and phase and speed detection processes are carried out. The APC and AFC outputs are obtained at pins 36 and 37, respectively, and applied to the servo loop as in the playback mode, thus driving the capstan motor.

1-4-8. Synchronous editing

1. In the synchronous editing operation, the capstan motor rotates in reverse direction in a specified amount as soon as the pause mode enters. The servo IC enters the synchronous editing mode as soon as the pause mode is released, and performs phase matching with CTL signal recorded previously, then allows recording again, thereby realizing the synchronous editing without picture disturbance at the connection point.
2. In the synchronous editing, the logic microcomputer counts the FG pulses and controls so that number of the same FG pulses is used in tape rewinding and phase matching operations, thus shortening tape length of overlapping recording.

2. Digital Circuit

2-1. Outline

DV-90 features operations of a new double speed playback and a 1/6 slow playback which have been realized with new digital technology in addition to the digital technology used in conventional models (DV-80).
Fig. 2-1 shows the field memory system used in DV-90.

The new systems differ in that (when compared with DV-80):

(1) Memory address reset

Digital reference signal created in the servo circuit is used as the reference for reset timing of a memory address.
(In DV-80 three signals of V-sync, SWP, PLAY + B were used as the timing signals.)

(2) Pseudo V-sync signal generation circuit (added)

The digital reference signal is used as the references signal for the memory address reset as previously stated. In this case, the timing for the memory address reset approximately coincides with the V-sync signal, so a part of the V-sync may not stored on the memory when data are memorized. As a result, the V-sync signal may be not restored when reading out the signal. To prevent this, the circuit develops a pseudo V-sync signal and superimpose the signal on a video signal.

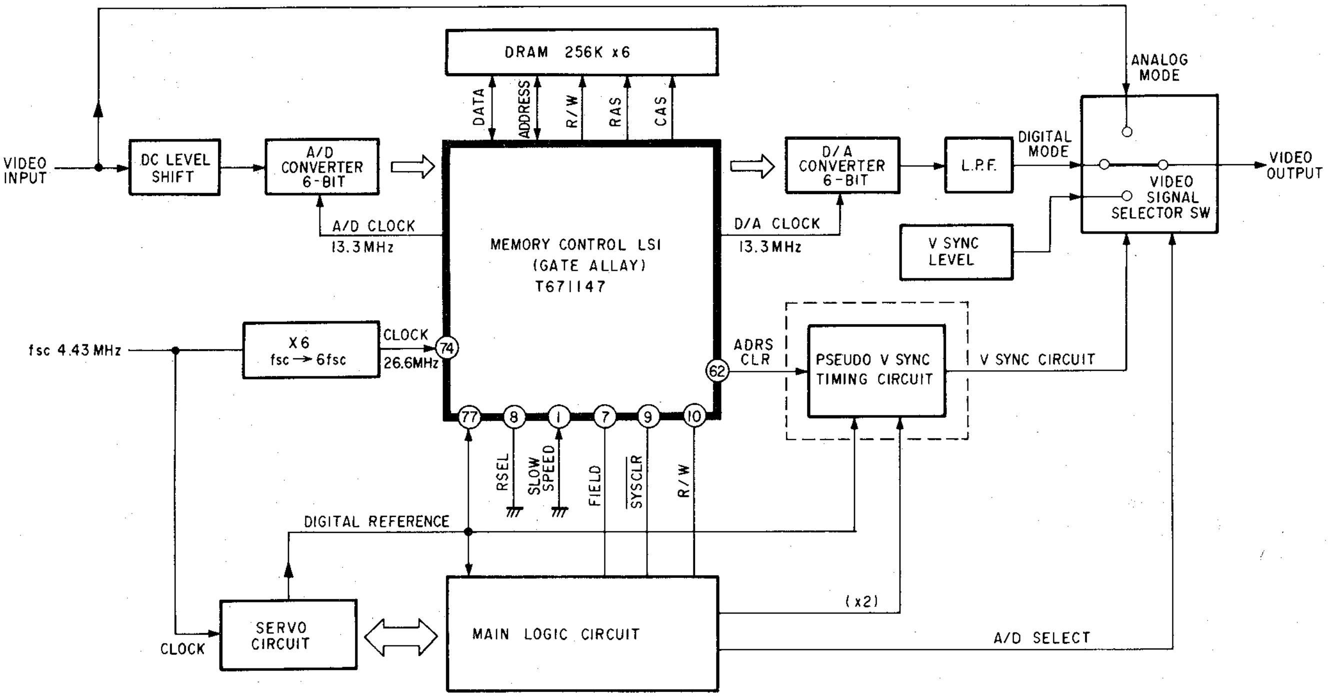

DRAM 256K x6
DATA
ADDRESS
R/W
RAS
CAS
ANALOG MODE
VIDEO INPUT
DC LEVEL SHIFT
A/D CONVERTER 6-BIT
D/A CONVERTER 6-BIT
L.P.F.
DIGITAL MODE
VIDEO OUTPUT
VIDEO SIGNAL SELECTOR SW
A/D CLOCK 13.3MHz
MEMORY CONTROL LSI (GATE ALLAY) T671147
D/A CLOCK 13.3MHz
V SYNC LEVEL
fsc 4.43 MHz
X6 fsc→6fsc
CLOCK 26.6MHz
74
ADRS CLR
62
PSEUDO V SYNC TIMING CIRCUIT
V SYNC CIRCUIT
77
8
1
7
9
10
RSEL
SLOW SPEED
FIELD
SYSCLR
R/W
DIGITAL REFERENCE
SERVO CIRCUIT
CLOCK
MAIN LOGIC CIRCUIT
(x2)
A/D SELECT

Fig. 2-1 Field memory system

2-2. Digital slow playback

2-2-1. Ref pulse

1. Before proceeding to the digital slow playback, description will be given on the Ref pulse used as a reference in the slow playback.
2. The Ref pulse is a 25 Hz square wave signal and synchronized with the V-sync signal in the record and EE modes. In the EE mode, the IC501 is set to the insert mode when pin 30 of the servo IC is set to low, thus allowing the V-sync signal to be accepted.
3. The Ref pulse is in phase with the SW pulse at pin 4 of P506.

2-2-2. Memory writing position in slow playback mode

1. In the slow playback operation, the capstan motor rotates at a constant speed rate of 1/6 times the normal speed and a field memory is used to reproduce a clean slow picture. Timings to write and to read on the track patterns are shown in Fig. 2-2.
2. As can be seen from tracing patterns in Fig. 2-2, envelope reaches a maximum value at 8th field after a CTL pulse is accepted, so this part is written on the memory.
3. The slow playback circuit consists of the Ref pulse 1/6 division circuit (IC506, IC505 (pins 1 to 7)), slow tracking circuit (IC505 (pins 9 to 15)), and a phase detector circuit (IC507).
4. In the slow mode, three state input pin 28 (VP-ON) of IC501 (TD6361N-C5) is set to the middle and this counts down the clock for the C-AFC system to 1/6 to perform 1/6 slow operation. The AFC output is obtained as a PWM output at pin 37 as in the normal playback operation.
5. Phase detection is carried out by an external circuit. That is, phase difference of two input pulses is detected (TP513-CTL, TP505-slow tracking) and a voltage proportional to the phase difference is developed. The signal is mixed with the speed detection output in IC501 (pins 39 to 41) and then outputs.
6. The logic microcomputer starts counting operation for the Ref pulse at falling edge of the 1/6 Ref pulse (TP502), and outputs a R/W signal. When 5th Ref pulse has been counted, thereby allowing memory writing operation.

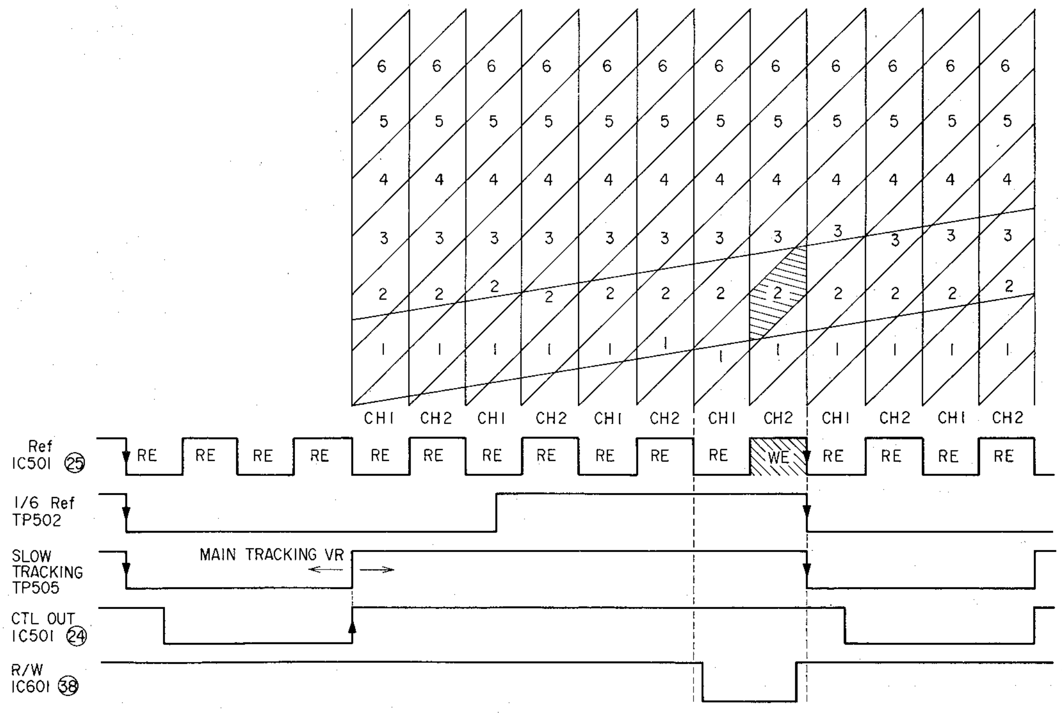

6 6 6 6 6 6 6 6 6 6 6 6
5 5 5 5 5 5 5 5 5 5 5 5
4 4 4 4 4 4 4 4 4 4 4 4
3 3 3 3 3 3 3 3 3 3 3 3
2 2 2 2 2 2 2 2 2 2 2 2
1 1 1 1 1 1 1 1 1 1 1 1
CH1 CH2 CH1 CH2 CH1 CH2 CH1 CH2 CH1 CH2 CH1 CH2
Ref IC501 ㉕
RE RE RE RE RE RE RE RE RE RE RE WE RE RE RE RE
1/6 Ref TP502
SLOW TRACKING TP505
MAIN TRACKING VR
CTL OUT IC501 ㉔
R/W IC601 ㊳

Fig. 2-2 Head tracing patterns and memory write/read timings in the slow playback mode

2-2-3. Capstan APC circuit in slow playback

1. The capstan APC circuit in the slow playback mode uses a phase detector in IC507 (TC5081AP).
2. A slow tracking pulse signal developed at pin 9 of IC505 enters pin 7 of IC507 and phase of the pulse is compared with that of the CTL pulse output from pin 24 of IC501. The phase comparison is carried out at rising edges of the slow tracking pulse and the CTL pulse.
   Fig. 2-3 shows a timing chart for the phase comparison.

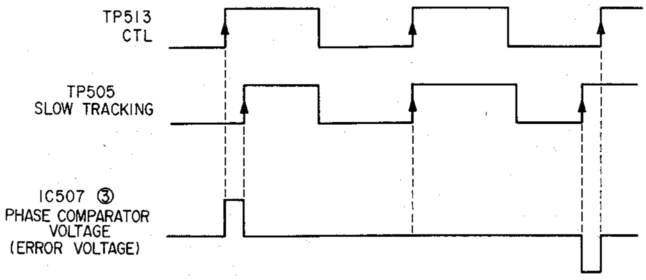


Fig. 2-3 Capstan APC timing chart in slow playback mode

2-3. Digital, double speed playback

1. Operation of the servo circuit is the same as that in V-93, and no special operation is performed to create digital pictures.
2. Tape is driven in double speed, and output signals from the CH-2 head are written on the memory every 2 fields (every 4 tracks), thus realizing double speed playback.

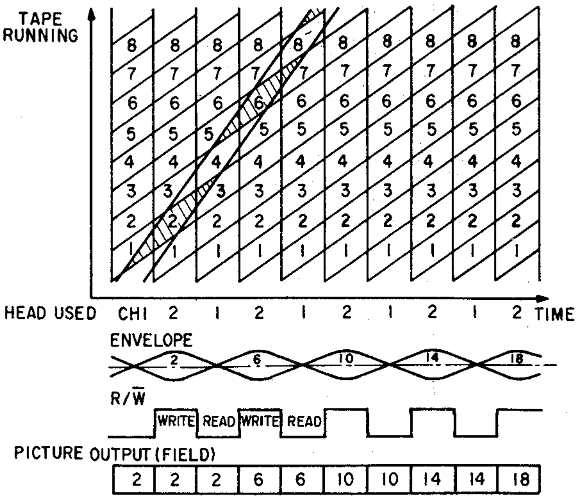

TAPE
RUNNING
8 7 6 5 4 3 2 1
HEAD USED CH1 2 1 2 1 2 1 2 1 2
TIME
ENVELOPE
2 6 10 14 18
R/W̄
WRITE READ WRITE READ
PICTURE OUTPUT (FIELD)
2 2 2 6 6 10 10 14 14 18

Fig. 2-4

3. Circuit Description (Digital Circuit)

3-1. Outline of memory control circuit

1. The memory control circuit is a field memory circuit consisting of an A/D, D/A converter circuits, memory units and control circuits for them. Timings for writing and reading (RE/WE) are under control of the main microcomputer and the writing and reading operations are conducted for one field at a time by referring to Ⓚ REF.
2. SYS.CLR (system clear) signal is a signal to control use or non use of the field memory, and sets the digital mode when it is "H" level, thus operating the field memory.
3. RE/WE (read/write) signal is a signal to control reading and writing operations for the field memory, and "L" allows writing and "H" reading. The switching timing for the operations is determined in synchronization with Ⓚ REF inside ICV01.

(Ⓚ REF = Digital reference signal)

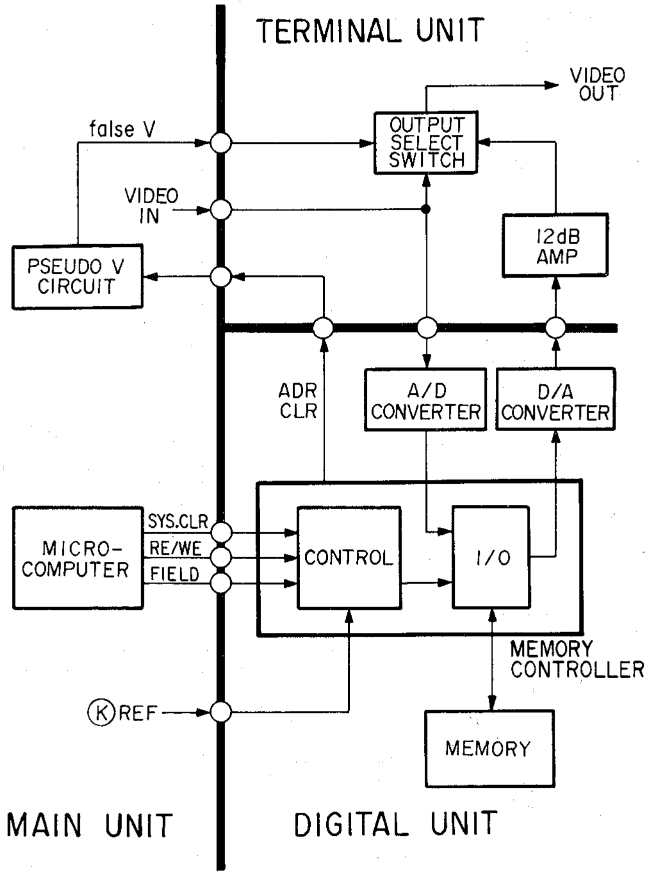
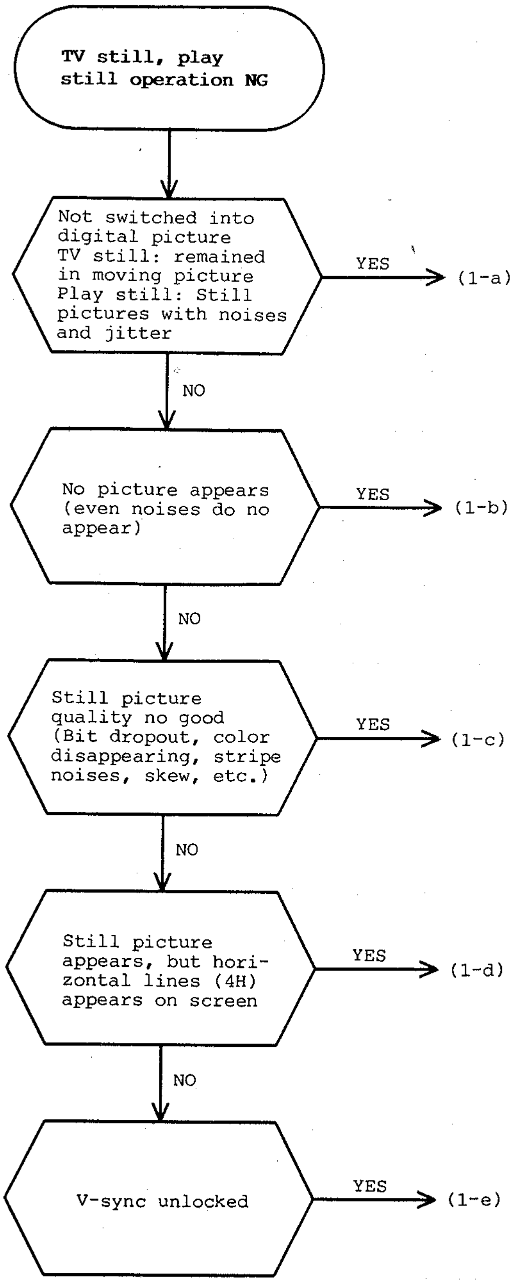
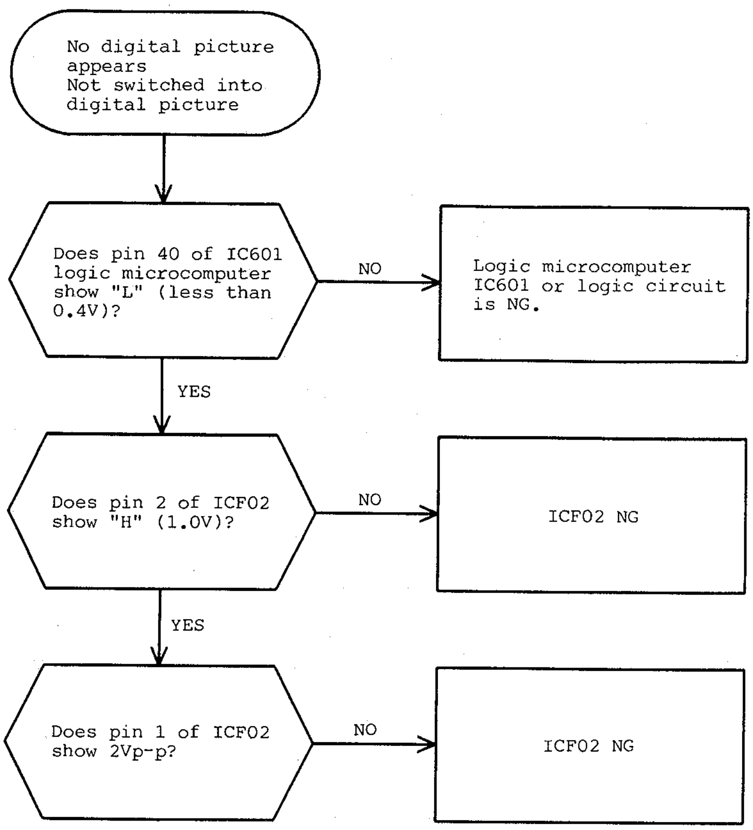

TERMINAL UNIT
VIDEO OUT
false V
OUTPUT SELECT SWITCH
VIDEO IN
12dB AMP
PSEUDO V CIRCUIT
ADR CLR
A/D CONVERTER
D/A CONVERTER
MICRO-COMPUTER
SYS.CLR
RE/WE
FIELD
CONTROL
I/O
MEMORY CONTROLLER
ⓀREF
MEMORY
MAIN UNIT
DIGITAL UNIT

Fig. 3-1 System block diagram

(1)


TV still, play still operation NG
Not switched into digital picture TV still: remained in moving picture Play still: Still pictures with noises and jitter
YES
(1-a)
NO
No picture appears (even noises do no appear)
YES
(1-b)
NO
Still picture quality no good (Bit dropout, color disappearing, stripe noises, skew, etc.)
YES
(1-c)
NO
Still picture appears, but hori-zontal lines (4H) appears on screen
YES
(1-d)
NO
V-sync unlocked
YES
(1-e)

(1-a)


No digital picture appears Not switched into digital picture
Does pin 40 of IC601 logic microcomputer show "L" (less than 0.4V)?
NO
Logic microcomputer IC601 or logic circuit is NG.
YES
Does pin 2 of ICF02 show "H" (1.0V)?
NO
ICF02 NG
YES
Does pin 1 of ICF02 show 2Vp-p?
NO
ICF02 NG

(1-b)

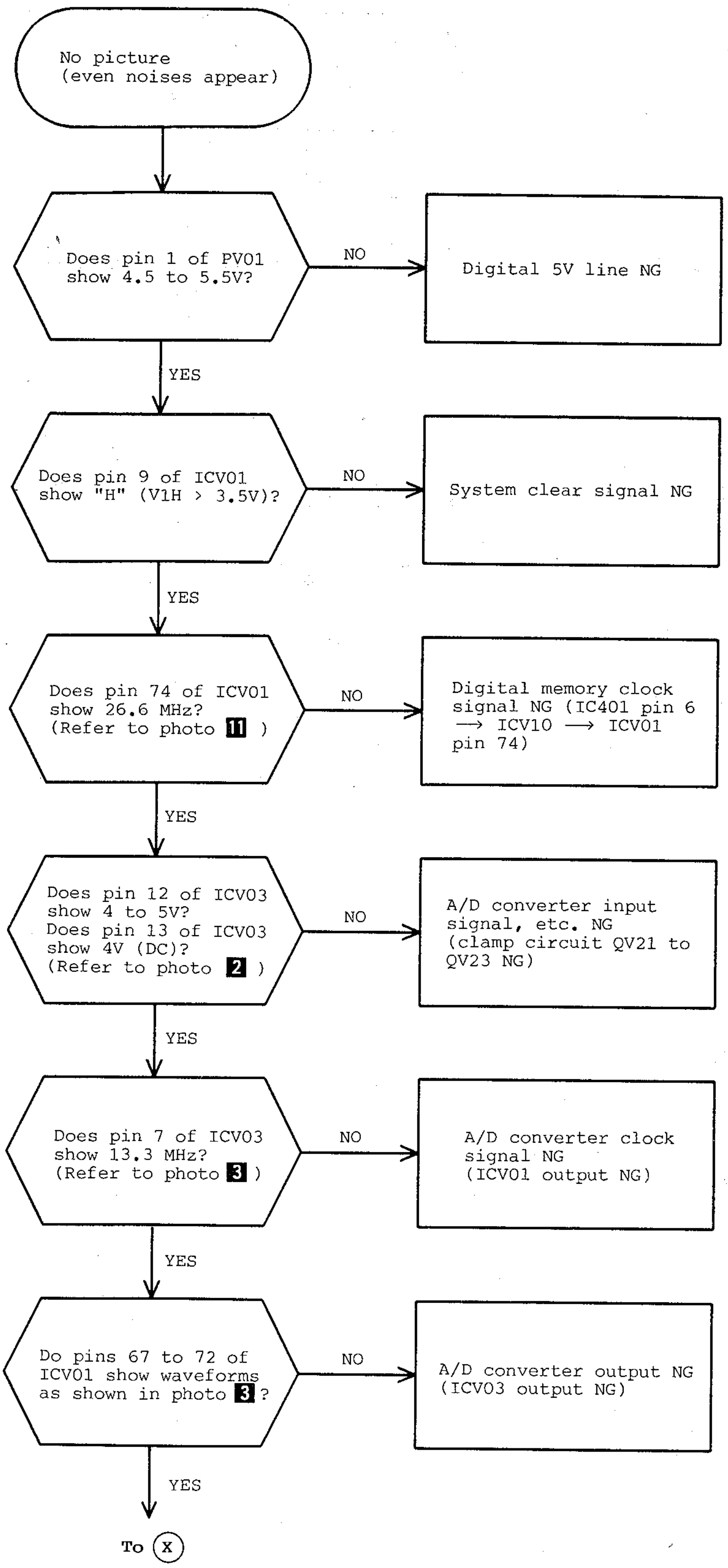

No picture
(even noises appear)
Does pin 1 of PV01
show 4.5 to 5.5V?
NO
Digital 5V line NG
YES
Does pin 9 of ICV01
show "H" (V1H > 3.5V)?
NO
System clear signal NG
YES
Does pin 74 of ICV01
show 26.6 MHz?
(Refer to photo 11)
NO
Digital memory clock
signal NG (IC401 pin 6
⟶ ICV10 ⟶ ICV01
pin 74)
YES
Does pin 12 of ICV03
show 4 to 5V?
Does pin 13 of ICV03
show 4V (DC)?
(Refer to photo 2)
NO
A/D converter input
signal, etc. NG
(clamp circuit QV21 to
QV23 NG)
YES
Does pin 7 of ICV03
show 13.3 MHz?
(Refer to photo 3)
NO
A/D converter clock
signal NG
(ICV01 output NG)
YES
Do pins 67 to 72 of
ICV01 show waveforms
as shown in photo 3 ?
NO
A/D converter output NG
(ICV03 output NG)
YES
To X

Table 3-1 IC list (DIGITAL circuit)

Symbol No.	Name	Function
ICV10	TA7374P	Tripler
ICV02	MB40776	6 bit D/A conversion
ICV03	MB40576	6 bit A/D conversion
ICV01	T671147	Memory control (READ/WRITE address space 64K) Serial-parallel conversion Parallel-serial conversion [6 bit ⟷ 6 bit x 4] Timing control address clear
ICV04 to ICV09	TMM-41464-12	64k x 4 D-RAM (access time 120nsec.)

3-2. Signal flow

3-2-1. Video input to AD conversion

1. A video signal of approx. 2Vp-p sent from the video circuit enters pin 5 of PV02, passes the buffer amplifier QV21 where the sync tip voltage is clamped at approx. 4V and then enters pin 12 of ICV03, AD converter.
2. The input signal is converted into 6 bit parallel digital signals with the upper limit reference voltage of 5V (power supply voltage at pin 11 VRT) and lower limit voltage of approx. 4V (pin 13 VRB). The converted outputs are obtained from pins 1 to 6 (D1 to D6). In this case, clock signal of 3fsc (13.3 MHz) is supplied from ICV01 on the memory control circuit and inputs to pin 7.
3. Since the video input signal clamp is performed so that the sync tip voltage level is almost the same as the reference voltage (VRB), sufficient dynamic range is assured, thus preventing cause of flatness in white.

3-2-2. Memory control to or from memory

1. The 6 bit digital signals converted by ICV03 enter pins 67 to 72 of ICV01 memory control IC. However, these signals can not be written on the memory directly as their transfer rate (13.3Mb/s) is higher than the memory speed. So SP (Serial-Parallel) conversion is performed, thereby the transfer rate is reduced by 1/4 or to 6 bit x 4, 3.33Mb/s.
2. In the WRITE mode, I/O ports are set to the output mode and the signals are transferred to the memory IC and written on the IC. At the same time the signals are sent to the PS (Parallel-Serial) conversion circuit.
3. In the READ mode, the I/O ports are set to the input mode, allowing signals to be sent from the memory to enter the PS conversion circuit. The signals AD-converted are not used.
4. Since the input signals (digital through signal) in the WRITE mode and signals from the memory in the READ mode (read signals) are signals in 6 bit x 4 (transfer rate of 3.33Mb/s), they are restored to the original 6 bit x 1 (transfer rate of 13.3Mb/s) signal by the PS conversion. The signals are then output from pins 55 to 60 and applied to the DA conversion circuit.

3-2-3. DA conversion to video output

1. The data signals output from the memory control ICV01 enters pins 10 to 15 of ICV02 DA conversion IC and converted into original analog signals. In this case, the clock signal of 13.3MHz output from the memory control IC enters pin 9 of ICV02.
2. The DA conversion is performed with the lower limit reference voltage of approx. 4V and the upper limit power supply voltage of 5V.
   The DA output signal enters the output amplifier QV26 and LPF where clock signal leakage is filtered and the output level is limited to approx. 0.5Vp-p. Thus processed output is applied to pin 7 of PV02.

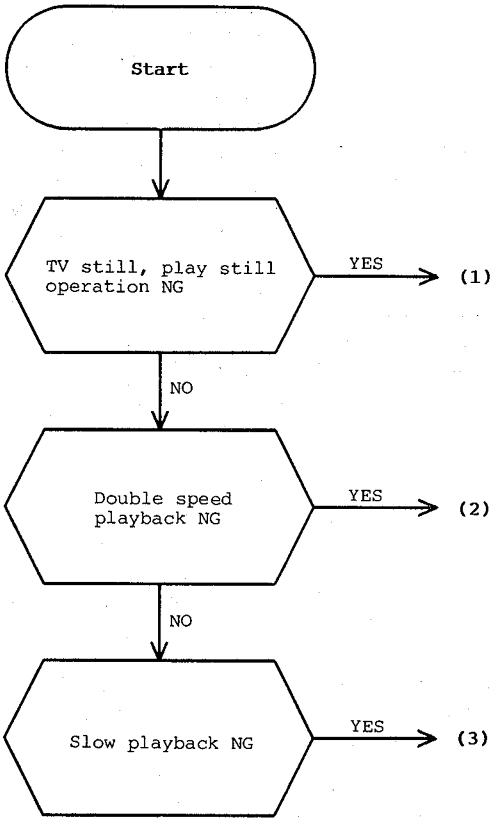
3-3. Peripheral circuits (Clock circuit)

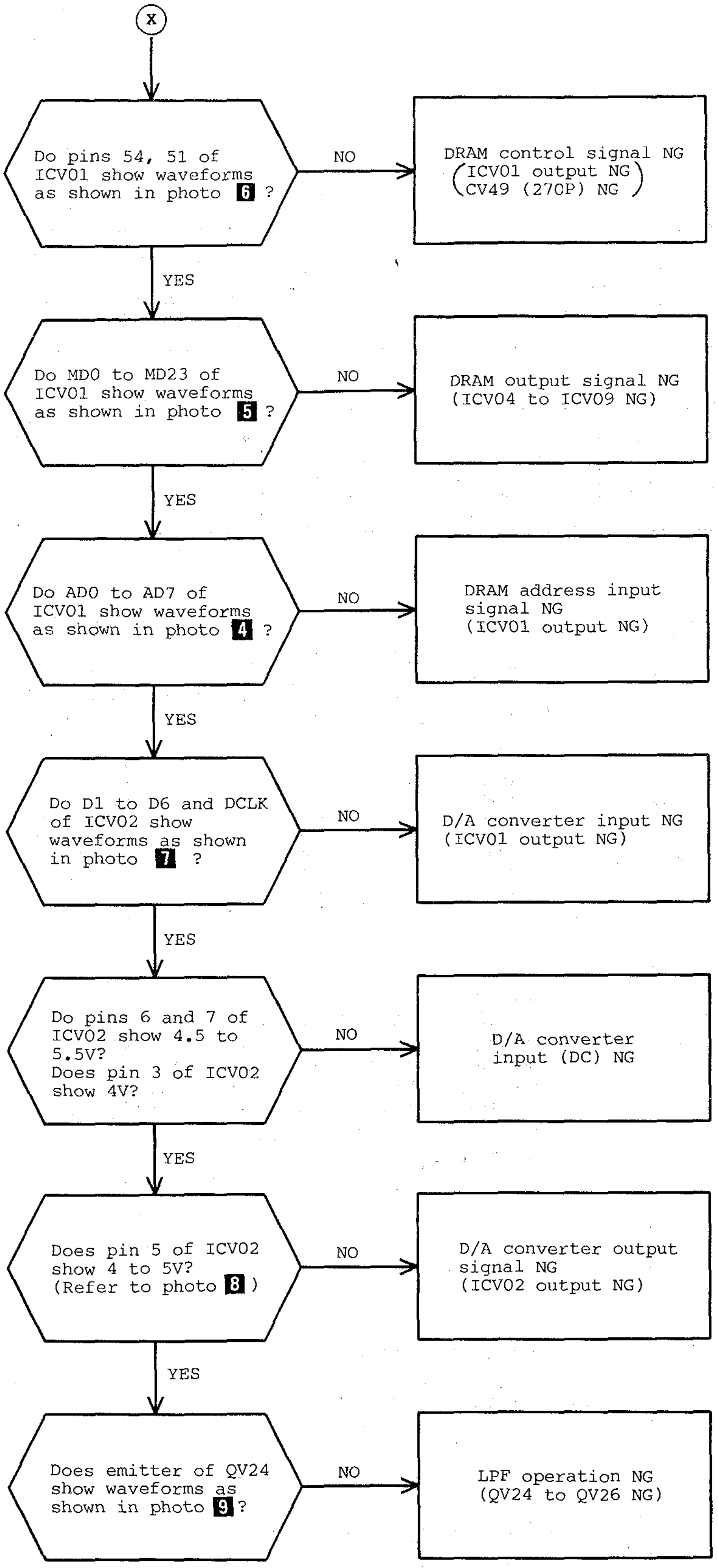
Since the memory control ICV01 needs clock signal of 6fsc (26.6MHz), 2fsc (8.87MHz) signal sent from the video circuit is tripled by ICV10.

3-4. Output switching circuit

1. The switching circuit selects a video signal from the video circuit or a signal processed in the digital unit. The switching is performed by ICF02 on the terminal unit.
2. The video signal from the video circuit enters pin 6 of ICF02 and the video signal from the digital circuit enters pin 1 of ICF02. These two signals are switched by an A/D switching signal sent from the logic circuit. The A/D switching signal enters pin 2 of ICF02 and the video signal from the video circuit is selected when the switching signal is "L", and the video signal from the digital circuit is slected when the switching signal is "H". Thus selected output develops at pin 8 of ICF02.

Troubleshooting diagnosis flow chart (Digital unit)



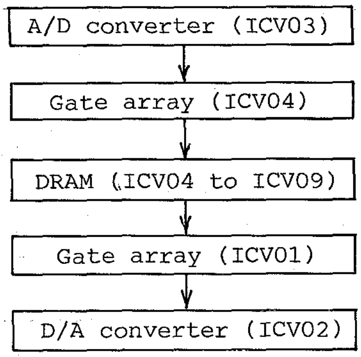

X
Do pins 54, 51 of ICV01 show waveforms as shown in photo 6 ?
NO
DRAM control signal NG (ICV01 output NG CV49 (270P) NG)
YES
Do MD0 to MD23 of ICV01 show waveforms as shown in photo 5 ?
NO
DRAM output signal NG (ICV04 to ICV09 NG)
YES
Do AD0 to AD7 of ICV01 show waveforms as shown in photo 4 ?
NO
DRAM address input signal NG (ICV01 output NG)
YES
Do D1 to D6 and DCLK of ICV02 show waveforms as shown in photo 7 ?
NO
D/A converter input NG (ICV01 output NG)
YES
Do pins 6 and 7 of ICV02 show 4.5 to 5.5V? Does pin 3 of ICV02 show 4V?
NO
D/A converter input (DC) NG
YES
Does pin 5 of ICV02 show 4 to 5V? (Refer to photo 8)
NO
D/A converter output signal NG (ICV02 output NG)
YES
Does emitter of QV24 show waveforms as shown in photo 9 ?
NO
LPF operation NG (QV24 to QV26 NG)

Note:

1. When Read/$\overline{\text{Write}}$ pin 2 of PV03 is set to "L" level (grounded to GND), a picture signal transferred from pin 4 of PV02 (VIDEO IN) to pin 2 of PV02 (VIDEO OUT) every one field flows following path:

   When pin 4 of PV03, Ⓚ REF = "H" (memory writing field), A/D converter (ICV03) ⟶ gate array (ICV01) ⟶ D/A converter (ICV02)

   When Ⓚ REF = "L" (memory reading field)


A/D converter (ICV03)
Gate array (ICV04)
DRAM (ICV04 to ICV09)
Gate array (ICV01)
D/A converter (ICV02)

   Accordingly, Ⓚ REF repeats H/L levels every one field. For example, if abnormality is found digital pictures in the field under Ⓚ REF signal in the "L" level, DRAM data (MD0 to MD23), address (AD0 to AD7), etc. may be suspected.

2. Test mode set terminals (TST1 ③, TST2 ④) of ICV01 should be set to "L" level during digital memory operation. That is, the terminals should be grounded.

ICV01

FUNCTION NAME	PIN NO.
MD0	20
MD1	21
MD2	22
MD3	26
MD4	27
MD5	28
MD6	29
MD7	30
MD8	31
MD9	32
MD10	34
MD11	35
MD12	36
MD13	37
MD14	38
MD15	39
MD16	43
MD17	44

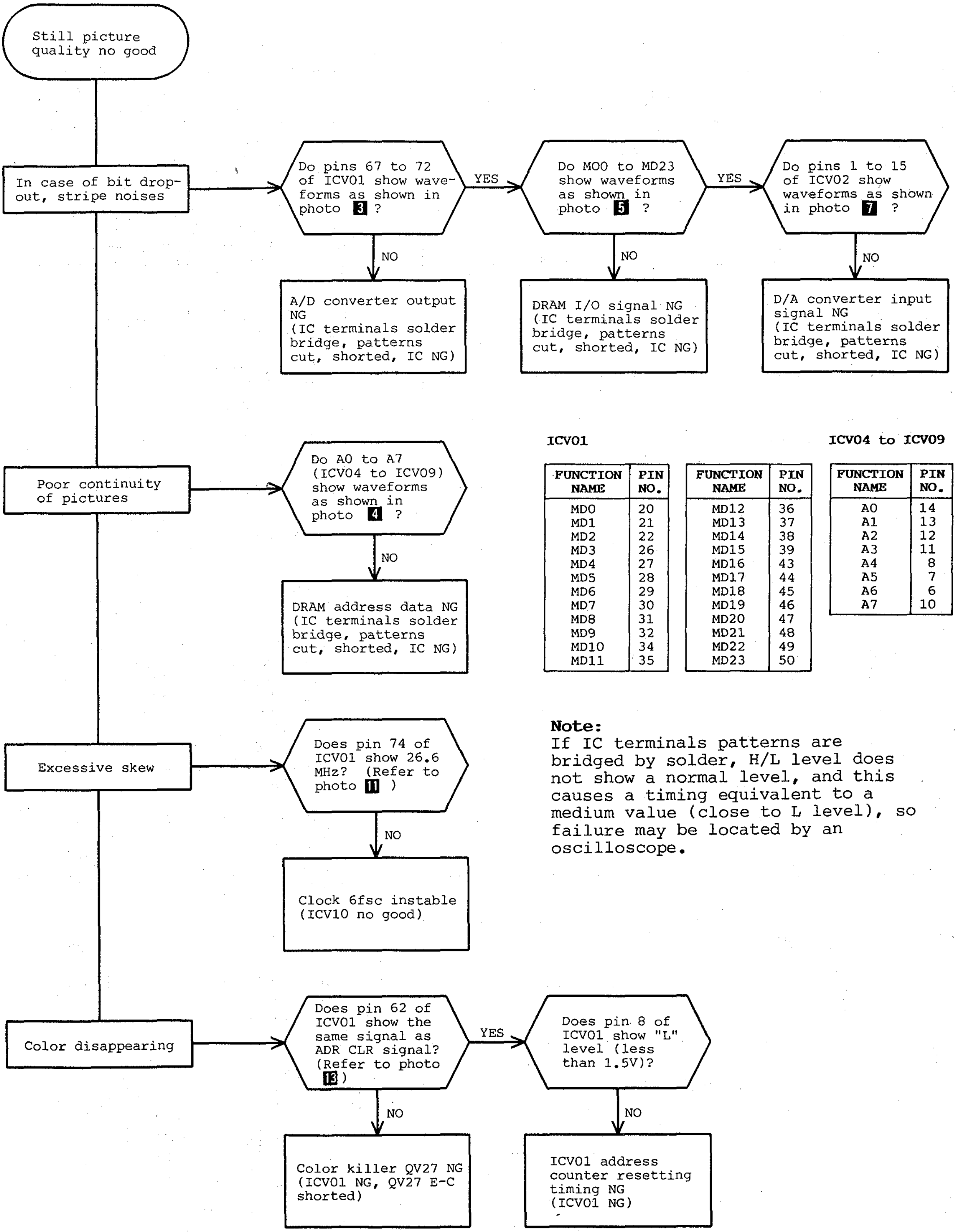
FUNCTION NAME	PIN NO.
MD18	45
MD19	46
MD20	47
MD21	48
MD22	49
MD23	50

FUNCTION NAME	PIN NO.
AD0	11
AD1	13
AD2	14
AD3	15
AD4	17
AD5	18
AD6	19
AD7	16

ICV02

FUNCTION NAME	PIN NO.
D1	10
D2	11
D3	12
D4	13
D5	14
D6	15
DCLK	9

(1-c)


Still picture quality no good
In case of bit drop-out, stripe noises
Do pins 67 to 72 of ICV01 show wave-forms as shown in photo 3 ?
YES
Do MO0 to MD23 show waveforms as shown in photo 5 ?
YES
Do pins 1 to 15 of ICV02 show waveforms as shown in photo 7 ?
NO
A/D converter output NG (IC terminals solder bridge, patterns cut, shorted, IC NG)
NO
DRAM I/O signal NG (IC terminals solder bridge, patterns cut, shorted, IC NG)
NO
D/A converter input signal NG (IC terminals solder bridge, patterns cut, shorted, IC NG)
Poor continuity of pictures
Do A0 to A7 (ICV04 to ICV09) show waveforms as shown in photo 4 ?
NO
DRAM address data NG (IC terminals solder bridge, patterns cut, shorted, IC NG)
Excessive skew
Does pin 74 of ICV01 show 26.6 MHz? (Refer to photo 11)
NO
Clock 6fsc instable (ICV10 no good)
Color disappearing
Does pin 62 of ICV01 show the same signal as ADR CLR signal? (Refer to photo 13)
YES
Does pin 8 of ICV01 show "L" level (less than 1.5V)?
NO
Color killer QV27 NG (ICV01 NG, QV27 E-C shorted)
NO
ICV01 address counter resetting timing NG (ICV01 NG)

ICV01

FUNCTION NAME	PIN NO.
MD0	20
MD1	21
MD2	22
MD3	26
MD4	27
MD5	28
MD6	29
MD7	30
MD8	31
MD9	32
MD10	34
MD11	35

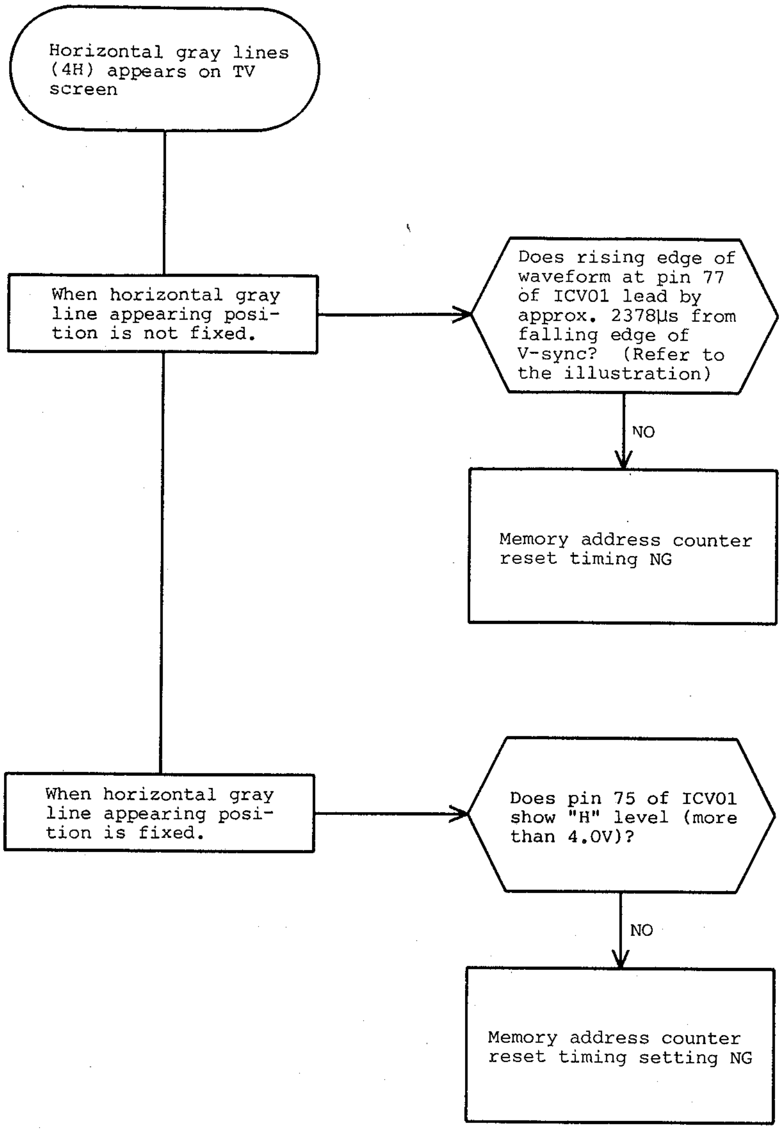
FUNCTION NAME	PIN NO.
MD12	36
MD13	37
MD14	38
MD15	39
MD16	43
MD17	44
MD18	45
MD19	46
MD20	47
MD21	48
MD22	49
MD23	50

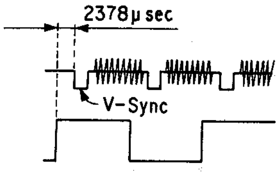
ICV04 to ICV09

FUNCTION NAME	PIN NO.
A0	14
A1	13
A2	12
A3	11
A4	8
A5	7
A6	6
A7	10

Note:
If IC terminals patterns are bridged by solder, H/L level does not show a normal level, and this causes a timing equivalent to a medium value (close to L level), so failure may be located by an oscilloscope.

(1-d)

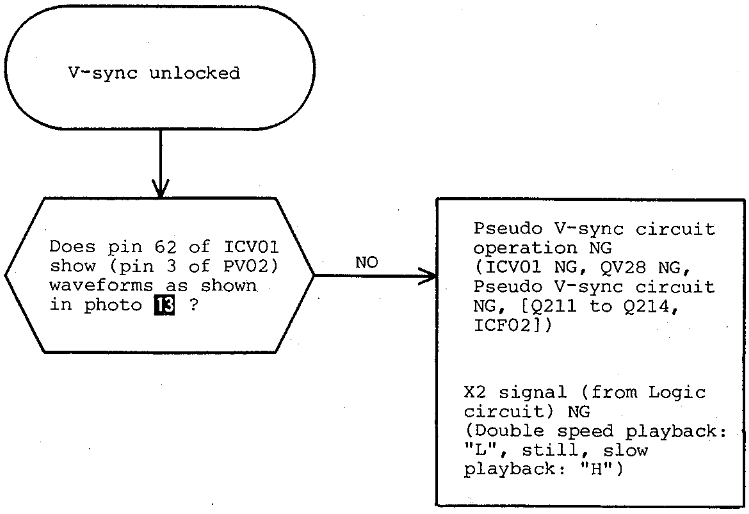

Horizontal gray lines (4H) appears on TV screen
When horizontal gray line appearing position is not fixed.
Does rising edge of waveform at pin 77 of ICV01 lead by approx. 2378µs from falling edge of V-sync? (Refer to the illustration)
NO
Memory address counter reset timing NG
When horizontal gray line appearing position is fixed.
Does pin 75 of ICV01 show "H" level (more than 4.0V)?
NO
Memory address counter reset timing setting NG


2378µ sec
V-Sync

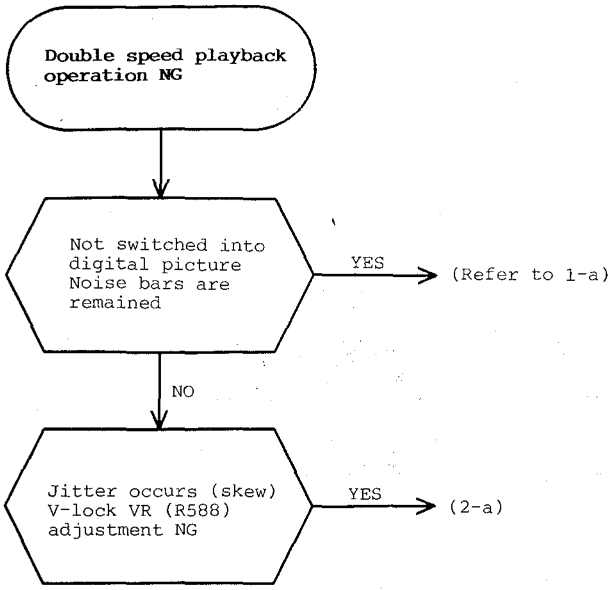
ICV01, Pin 77

Note:
Here, horizontal gray lines stand for pseudo picture signal inserted immediately before V-sync signal, and width (H number) of the horizontal lines will vary.
That is, the width is about 4H in TV still, play still, about 2 to 4H in double speed playback mode, and about 5 to 6H (changes every field) in 1/6 slow playback.

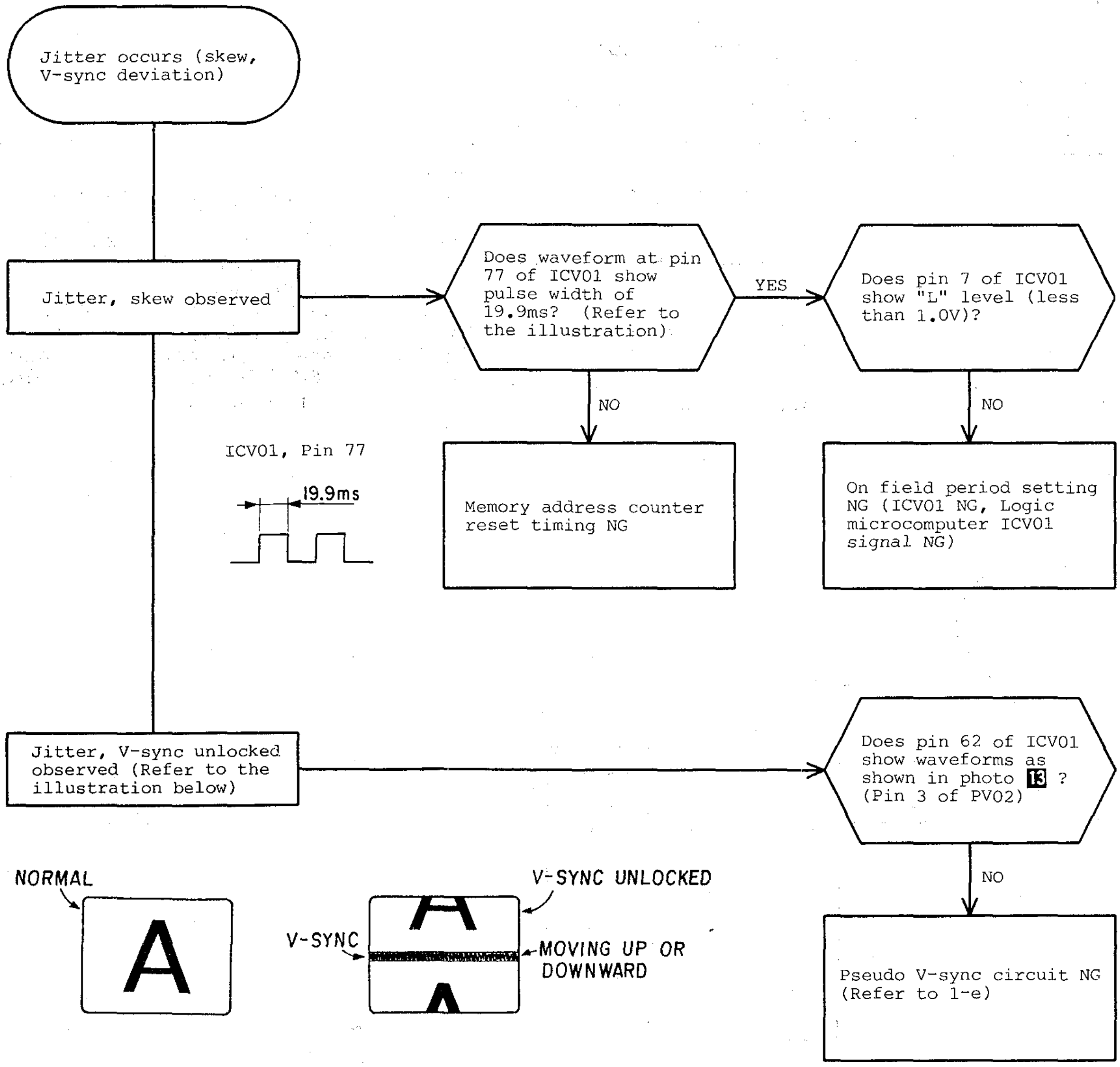
(1-e)


V-sync unlocked
Does pin 62 of ICV01 show (pin 3 of PV02) waveforms as shown in photo 13 ?
NO
Pseudo V-sync circuit operation NG (ICV01 NG, QV28 NG, Pseudo V-sync circuit NG, [Q211 to Q214, ICF02])
X2 signal (from Logic circuit) NG (Double speed playback: "L", still, slow playback: "H")

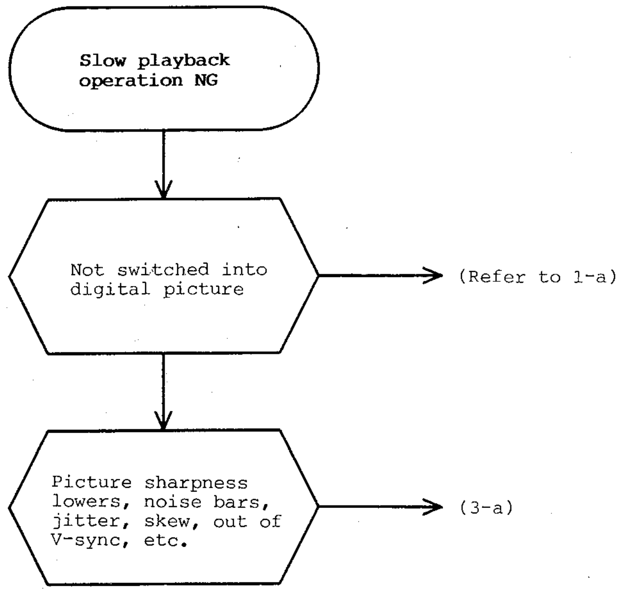
(2)


Double speed playback operation NG
Not switched into digital picture Noise bars are remained
YES
(Refer to 1-a)
NO
Jitter occurs (skew) V-lock VR (R588) adjustment NG
YES
(2-a)

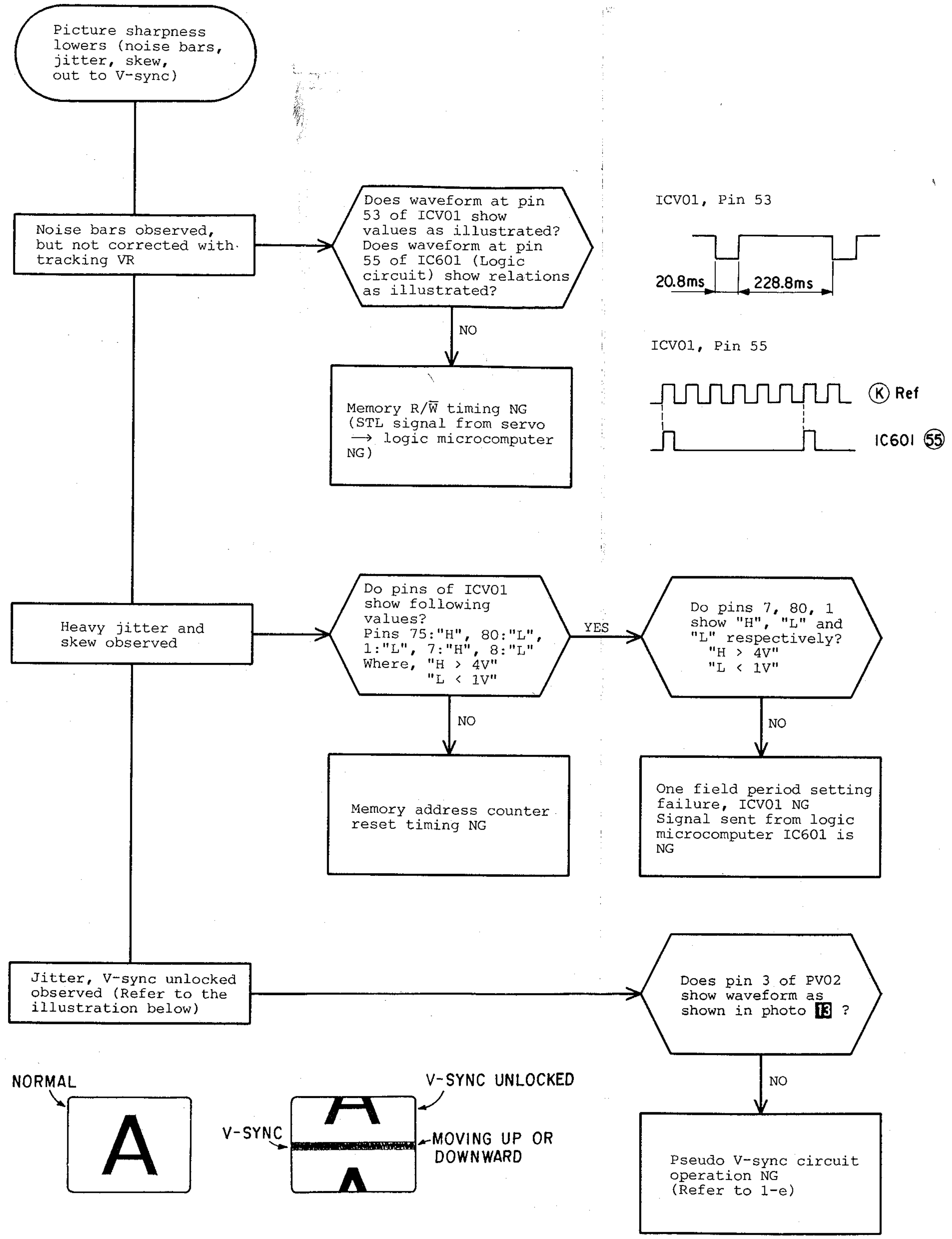
(2-a)


Jitter occurs (skew, V-sync deviation)
Jitter, skew observed
Does waveform at pin 77 of ICV01 show pulse width of 19.9ms? (Refer to the illustration)
YES
Does pin 7 of ICV01 show "L" level (less than 1.0V)?
NO
NO
ICV01, Pin 77
19.9ms
Memory address counter reset timing NG
On field period setting NG (ICV01 NG, Logic microcomputer ICV01 signal NG)
Jitter, V-sync unlocked observed (Refer to the illustration below)
Does pin 62 of ICV01 show waveforms as shown in photo 13 ? (Pin 3 of PV02)
NO
NORMAL
V-SYNC UNLOCKED
V-SYNC
MOVING UP OR DOWNWARD
Pseudo V-sync circuit NG (Refer to 1-e)

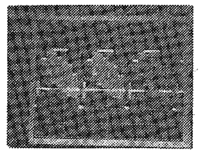
(3)


Slow playback operation NG
Not switched into digital picture
(Refer to 1-a)
Picture sharpness lowers, noise bars, jitter, skew, out of V-sync, etc.
(3-a)

(3-a)

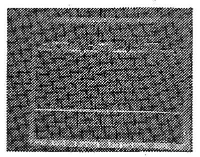

Picture sharpness lowers (noise bars, jitter, skew, out to V-sync)
Noise bars observed, but not corrected with tracking VR
Does waveform at pin 53 of ICV01 show values as illustrated? Does waveform at pin 55 of IC601 (Logic circuit) show relations as illustrated?
NO
Memory R/W̄ timing NG (STL signal from servo ⟶ logic microcomputer NG)
ICV01, Pin 53
20.8ms
228.8ms
ICV01, Pin 55
Ⓚ Ref
IC601 (55)
Heavy jitter and skew observed
Do pins of ICV01 show following values? Pins 75:"H", 80:"L", 1:"L", 7:"H", 8:"L" Where, "H > 4V" "L < 1V"
YES
Do pins 7, 80, 1 show "H", "L" and "L" respectively? "H > 4V" "L < 1V"
NO
Memory address counter reset timing NG
NO
One field period setting failure, ICV01 NG Signal sent from logic microcomputer IC601 is NG
Jitter, V-sync unlocked observed (Refer to the illustration below)
Does pin 3 of PV02 show waveform as shown in photo 13 ?
NO
Pseudo V-sync circuit operation NG (Refer to 1-e)
NORMAL
A
V-SYNC
V-SYNC UNLOCKED
MOVING UP OR DOWNWARD

1 PV02, Pin ⑤



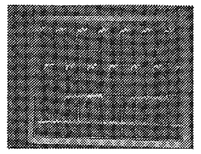
V: 0.5V/div.
H: 20μs/div.

2 ICV03, Pin ⑫



V: 1.0V/div.
H: 20μs/div.

3 a: ICV03, Pin ⑦ b: ICV03, Pin ④

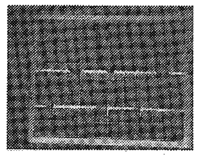


a

b

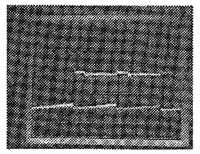
V: 2.0V/div.
H: 50ns/div.

4 ICV01, Pin ⑭



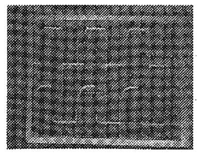
V: 2.0V/div.
H: 100ns/div.

5 ICV01, Pin ㊽



V: 2.0V/div.
H: 100ns/div.

6 a: ICV01, Pin ㊿1 b: ICV01, Pin (54)

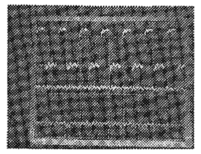


a

b

V: 2.0V/div.
H: 100ns/div.

7 a: ICV02, Pin ⑨ b: ICV02, Pin ⑫

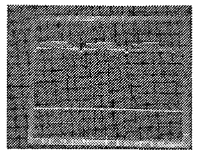


a

b

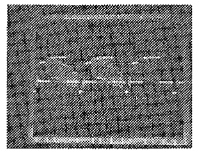
V: 2.0V/div.
H: 50ns/div.

8 ICV02, Pin ⑤



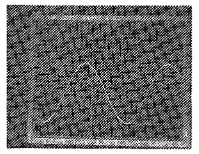
V: 1.0V/div.
H: 20μs/div.

9 QV24, Emitter



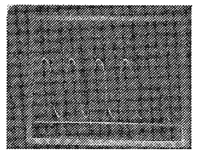
V: 200mV/div.
H: 20μs/div.

10 PV02, Pin ①



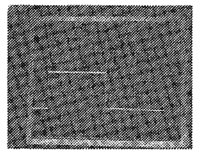
V: 200mV/div.
H: 20ns/div.

11 QV30, Emitter



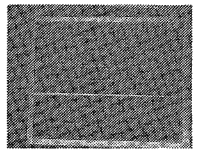
V: 1.0V/div.
H: 20ns/div.

12 PV03, Pin ④



V: 2.0V/div.
H: 5ms/div.

13 QV28, Emitter



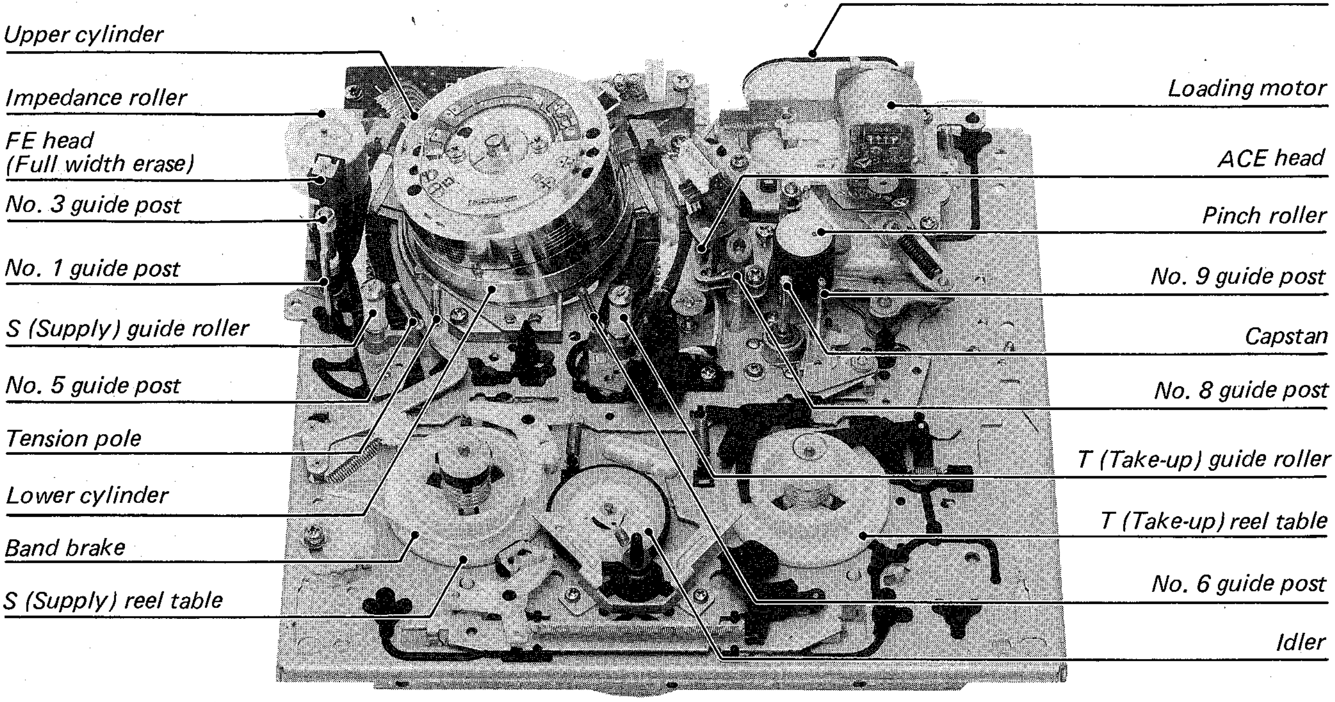
V: 2.0V/div.
H: 5ms/div.

SECTION 2
ADJUSTMENT PROCEDURES

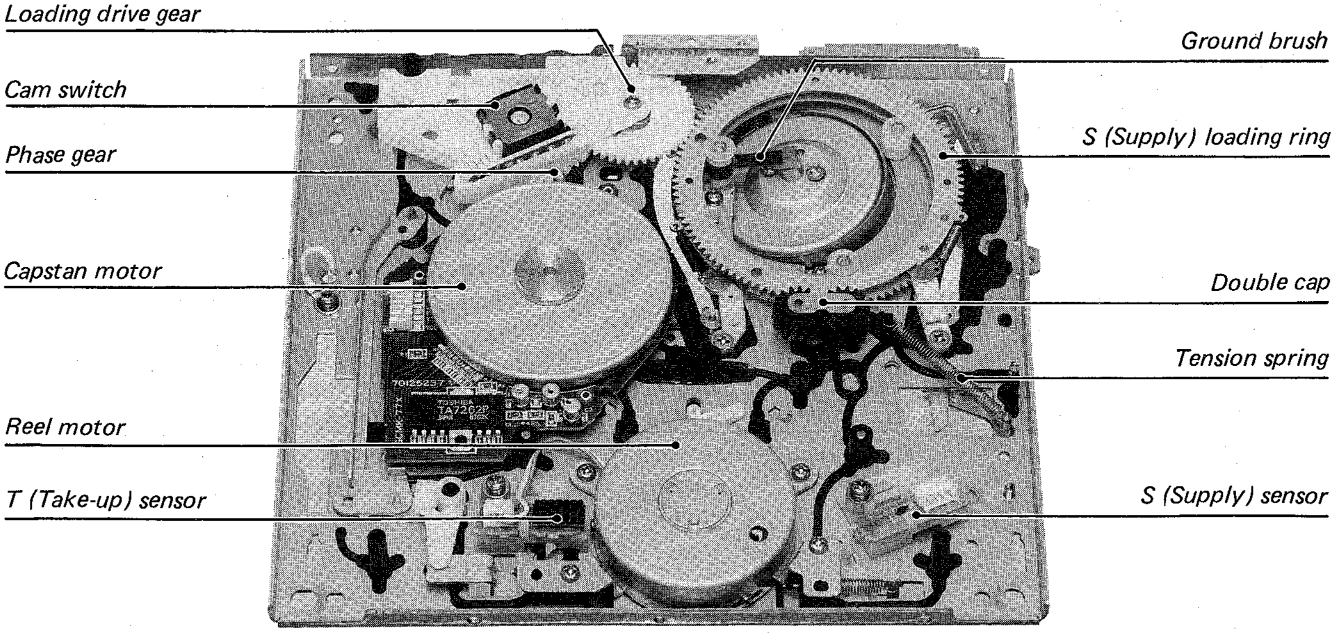
1. MECHANICAL ADJUSTMENT

1-1. Mechanical Parts Location

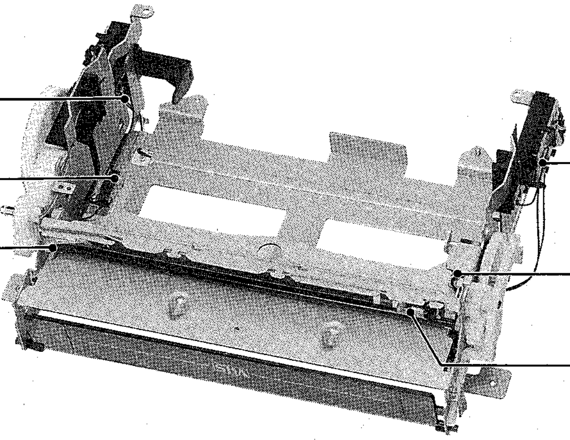
1-1-1. Top View

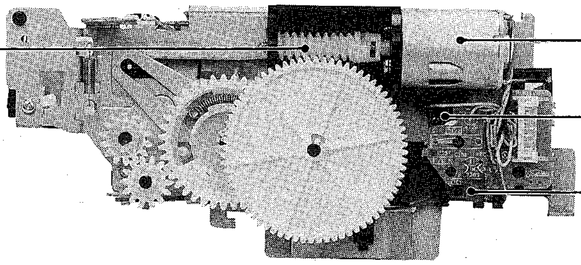

Upper cylinder
Impedance roller
FE head
(Full width erase)
No. 3 guide post
No. 1 guide post
S (Supply) guide roller
No. 5 guide post
Tension pole
Lower cylinder
Band brake
S (Supply) reel table
Loading belt
Loading motor
ACE head
Pinch roller
No. 9 guide post
Capstan
No. 8 guide post
T (Take-up) guide roller
T (Take-up) reel table
No. 6 guide post
Idler

1-1-2. Bottom View

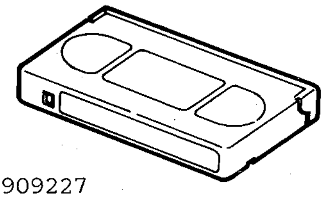
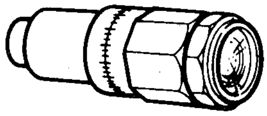
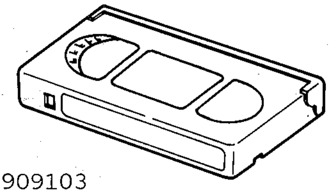
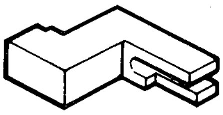
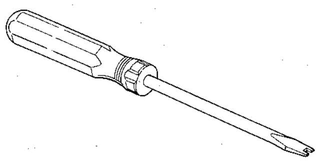
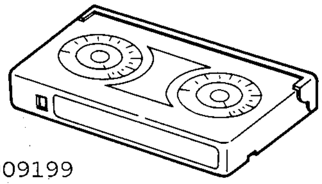
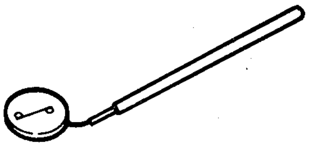
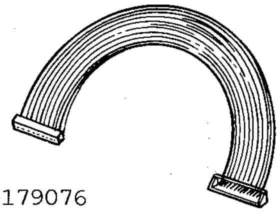

Loading drive gear
Cam switch
Phase gear
Capstan motor
Reel motor
T (Take-up) sensor
Ground brush
S (Supply) loading ring
Double cap
Tension spring
S (Supply) sensor

1-1-3. Front Loading Mechanism


Cassette down switch
Cassette detection switch (Right)
Slot out switch
Tape end detector
Cassette detection switch (Left)
Accidental erase prevention switch


Worm gear
FL (Front Loading) motor
Cassette down switch
Tape start detector

1-2. Servicing Jig List

Alignment tape (ST-C1)  70909227	Torque gauge  70909098	Back tension cassette gauge  70909103
Height gauge  70909113	Taper nut driver  70909228	Torque cassette gauge (KT-300NR)  70909199
Dental mirror  70954003	Patch cord  70179076	MH-2 (70909094) can be used instead of alignment tape ST-C1.

1-3. Main Parts Replacement

1-3-1. Front Loading

(1) Front loading assembly

<Replacement>

1. Disconnect the relay cable connector from the Relay P.C. board.
2. Loosen 2 mounting screws on the deck top shield plate, and remove the shield plate.
3. Remove 2 screws securing the front loading assembly on the base.
4. First, pull the front loading assembly forward, unhook claws from the holes on the main base, and then take out the loading assembly upward, and replace it.

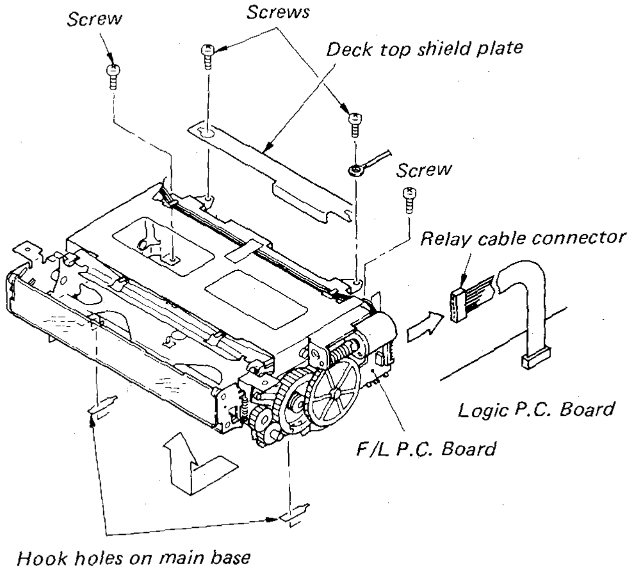


Fig. 1-3-1 Front loading assembly replacement

(2) Door

<Replacement>

1. Make sure the cassette holder is in the cassette eject position.
2. Turn the cassette door until the left door shaft matches its receptacle of the door bracket, and then slide the door rightward.
3. Warp the door forward at its center and disengage the left side of the door from the door bracket. Move the door left side to remove it.
4. Remove a door spring from the right door shaft and replace it. Apply slight amount of grease on both shafts of the door to replace.

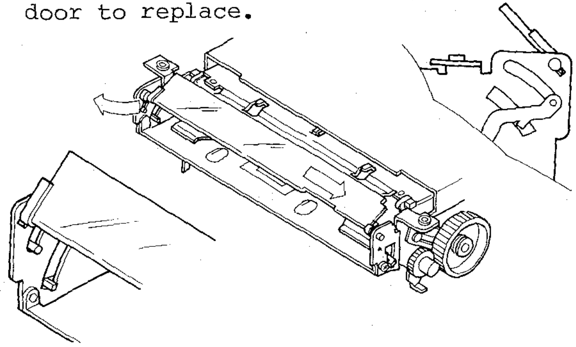


Fig. 1-3-2 Door replacement (1)

5. Insert the door spring into the right door shaft of the new door.
6. Insert the tip of door spring into the spring hook (hole) on the guide bracket, and insert the right door shaft into the guide bracket.

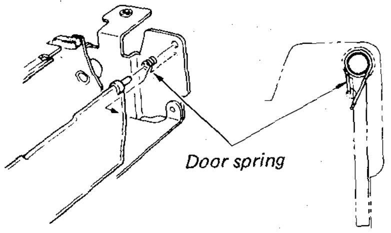


Fig. 1-3-3 Door replacement (2)

7. Insert the left door shaft into the guide bracket while warping the door slightly forward. In this case, make sure that the door lever pin is positioned as shown in Fig. 1-3-4.

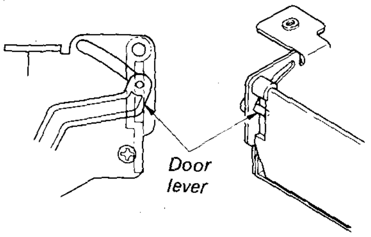


Fig. 1-3-4 Door replacement (3)

(3) Cassette detection switches, L, R

<Replacement>

1. Remove the front loading assembly from the chassis.
2. Place the front loading assembly upside down.
3. Unsolder leads from the switch terminals using a soldering iron. In this case, the unsoldering work will be made easily if the cassette holder is moved down by rotating the coupling section of the worm gear and the motor. (Do not touch your hand to gear teeth.)
4. Remove screws securing the switches and replace the switches.
5. When mounting new switches, perform the above previous steps in reverse order.

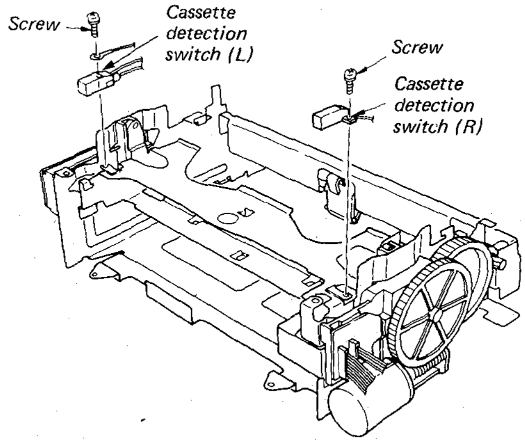


Fig. 1-3-5 Replacement of cassette detector

(4) Cassette down switch

<Replacement>

1. Remove the front loading assembly from the chassis.
2. Remove the FL P.C. board (R) unhooking the mold claws on the guide R.
3. Remove the screw securing the switch and take out the switch.
4. Unsolder the leads from the switch terminals using a soldering iron.
5. When remounting a new switch, perform the previous steps in reverse order.

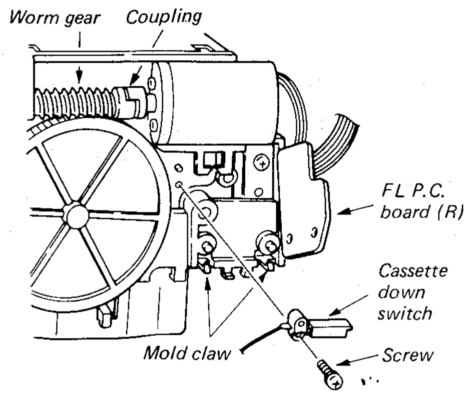

Worm gear
Coupling
FL P.C. board (R)
Cassette down switch
Mold claw
Screw

Fig. 1-3-6 Cassette down switch replacement

(5) Slot out switch and accidental erase prevention switch

1. Remove the front loading assembly from the chassis.
2. Place the loading assembly with the door facing upward.
3. Unsolder the leads from the switch terminals, using the soldering iron.
4. Remove the screw securing the switch.
5. When mounting the switch, perform the previous steps in reverse order.

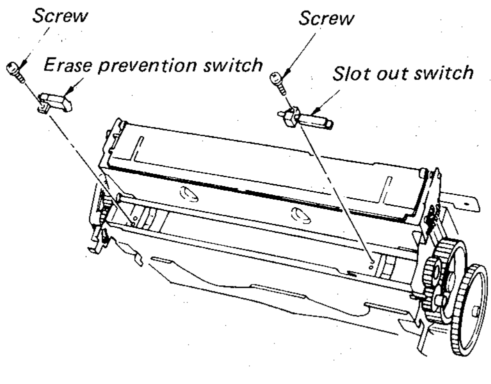

Screw
Screw
Erase prevention switch
Slot out switch

Fig. 1-3-7 Replacement of slot out switch and erase prevention switch

(6) FL motor assembly

<Replacement>

1. Remove the front loading assembly from the chassis.
2. Unsolder the leads from the motor terminals, using the soldering iron.
3. Remove the screws securing the FL motor assembly on the guide R and remove the assembly.
4. When mounting the assembly, perform the previous steps in reverse order.

Note:
When replacing the FL motor, always use a motor with a label in green letters. Do not use any other motor.

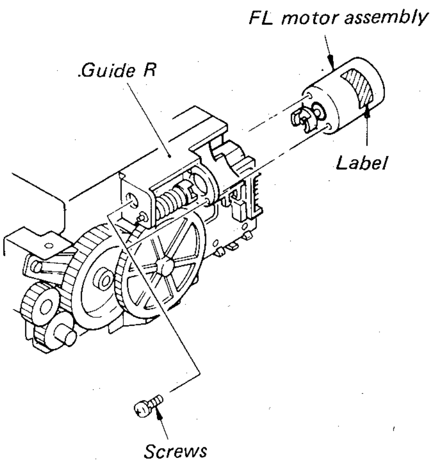

FL motor assembly
Guide R
Label
Screws

Fig. 1-3-8 Replacement of motor assembly

(7) Photo transistor

<Replacement>

1. Remove the front loading assembly from the chassis.
2. Remove the FL P.C. board (R) unhooking the mold claws on the guide R.
3. Unsolder the photo transistor from the FL P.C. board, using the soldering iron.

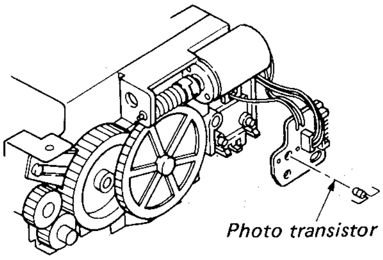


Photo transistor

Fig. 1-3-9 Replacement photo transistor on FL P.C. board (R)

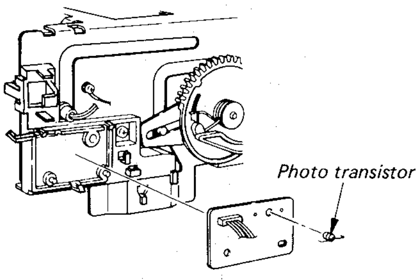


Photo transistor

Fig. 1-3-10 Replacement of photo transistor on FL P.C. board (L)

4. Bend leads of a new photo transistor as shown in Fig. 1-3-11.
5. When remounting the transistor, perform the previous steps in reverse order.
6. The replacement method will apply to both the photo transistors on the left and right FL P.C. boards.

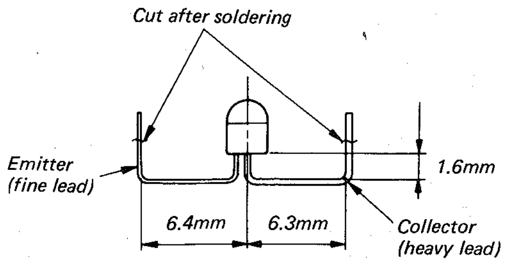

Cut after soldering
Emitter (fine lead)
1.6mm
6.4mm
6.3mm
Collector (heavy lead)

Fig. 1-3-11 Forming of photo transistor leads

1-3-2. Cylinder

(1) Upper cylinder assembly

<Inspection>

1. Check if video heads are damaged or worn out.
2. Check video heads for clogging. (Replace the upper cylinder assembly if the clogging is not remedied after cleaning.)

<Replacement>

1. Unsolder the relay terminals (at the marks Δ, 2 pairs - in total 2 locations) on the head relay P.C. board. The solder will be removed easily using a desoldering wire (Fig. 1-3-12/1-3-13).
2. Remove two screws (A) and remove the upper cylinder assembly.
3. Clean the new upper cylinder assembly and the surface of the flange before mounting, using a cleaning kit.
4. Align phases of the white part of Head relay P.C. board and Rotary transformer (A) P.C. board and then mount the upper cylinder. (Tightening torque; 3 - 4kg-cm.)
5. Perform the tape transport adjustment.

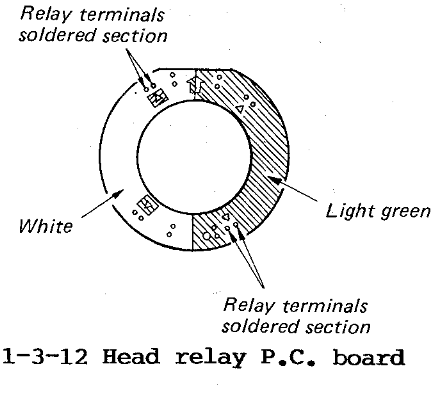

Relay terminals soldered section
White
Light green
Relay terminals soldered section

Fig. 1-3-12 Head relay P.C. board

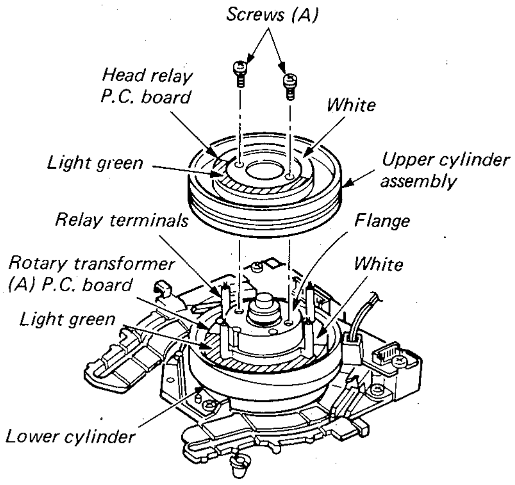

Screws (A)
Head relay P.C. board
White
Light green
Upper cylinder assembly
Relay terminals
Flange
Rotary transformer (A) P.C. board
White
Light green
Lower cylinder

Fig. 1-3-13 Upper cylinder replacement

(2) Cylinder motor

<Inspection>

1. Apply power to the cylinder motor separately.
2. If the motor does not rotate, replace the rotor or the stator.

<Rotor replacement>

1. Remove the ground cap.
2. Remove two rotor screws and replace the rotor. (Tightening torque; 3 - 4kg-cm.)

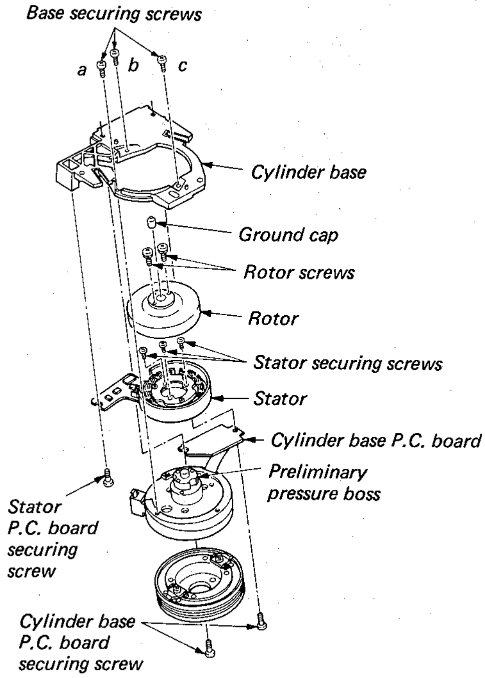

Base securing screws
a
b
c
Cylinder base
Ground cap
Rotor screws
Rotor
Stator securing screws
Stator
Cylinder base P.C. board
Preliminary pressure boss
Stator P.C. board securing screw
Cylinder base P.C. board securing screw

Fig. 1-3-14 Cylinder motor replacement

Note:
Mount a new rotor, matching the phase decision holes of rotor and preliminary pressure boss. (Fig. 1-3-14, 15)

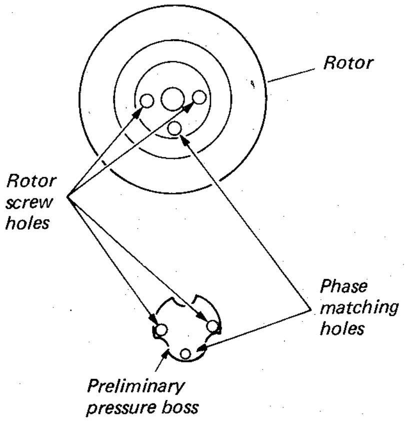

Rotor
Rotor screw holes
Phase matching holes
Preliminary pressure boss

Fig. 1-3-15 Phase matching between rotor and preliminary pressure boss

<Stator replacement>

1. Remove the cylinder assembly. (Refer to 1-3-2(3))
2. Remove two cylinder base P.C. board securing screws and stator P.C. board securing screw (Fig. 1-3-16).

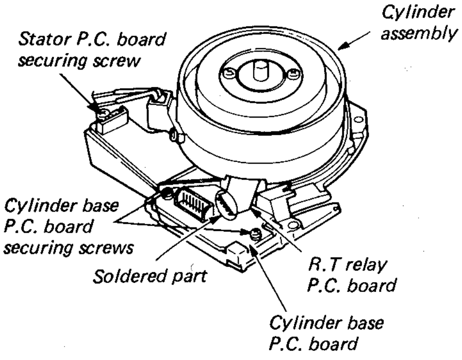

Stator P.C. board securing screw
Cylinder assembly
Cylinder base P.C. board securing screws
Soldered part
R.T relay P.C. board
Cylinder base P.C. board

Fig. 1-3-16 Relay P.C. board and cylinder base P.C. board

Note:
In this case, take care not to damage patterns of the R.T relay P.C. board. Also handle the cylinder base P.C. board carefully so that the cylinder is not damaged with the P.C. board.

3. Remove three base securing screws and remove the cylinder base. (Fig. 1-3-14)
4. Remove the rotor screws and the rotor. (Fig. 1-3-14)

Note:
Follow the procedures under "<Rotor replacement>".

5. Remove the stator securing screws.
6. Pull out the stator and replace it. (Tightening torque 1.5 - 2.5 kg-cm)
7. When mounting the cylinder assembly, perform the previous steps in reverse order.

Note:
Sequence of tightening base securing screws: tighten screw a first, b and c in any order. (Tightening torque is 3 - 4 kg-cm.) (Fig. 1-3-14)

8. Perform the tape transport adjustment.

(3) Cylinder assembly

<Inspection>

1. Check to see that rotating surface of the lower cylinder has no damage such as scratches, cracks, etc.
2. Check to see smooth rotation of the upper cylinder.
   If abnormality is found, replace the cylinder(s).

<Replacement>

1. Remove the Pre Amp P.C. board, 5P connector (cylinder motor), and the dew heater.
2. Remove three screws (A).
3. Remove the cylinder assembly.

Note:
In this case, move the impedance roller in direction shown by the arrow.

4. Align position of a new cylinder to the cylinder base, taking care not to touch the video heads directly and not to damage the cylinder surface.
   When mounting the cylinder assembly, perform the previous steps in reverse order.
5. Perform the tape transport adjustment.

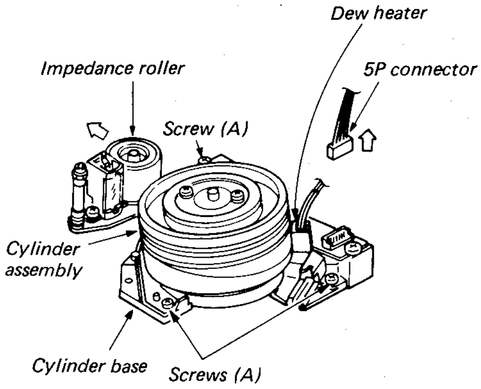

Dew heater
Impedance roller
5P connector
Screw (A)
Cylinder assembly
Cylinder base
Screws (A)

Fig. 1-3-17 Cylinder assembly replacement

1-3-3. Transport System Parts Replacement

(1) ACE head assembly replacement

1. Disconnect a 6P connector from the ACE P.C. board.
2. Turn the ACE height adjusting nut counterclockwise and remove the nut in order to remove ACE base assembly. (Fig. 1-3-18)

Note:
Note positions of the ACE base and the taper nut.

3. Remove the E-ring and the ACE azimuth adjusting screws in order to remove the ACE head assembly.
4. Remove the ACE P.C. board from the ACE head assembly.
5. Replace the ACE head assembly, according to the reverse procedures.
6. Rotate the ACE height adjustment nut until the ACE base and the upper position of the taper nut have the same position as noted in step 2.
7. After mounting, perform the tape transport adjustment, starting from the first step.

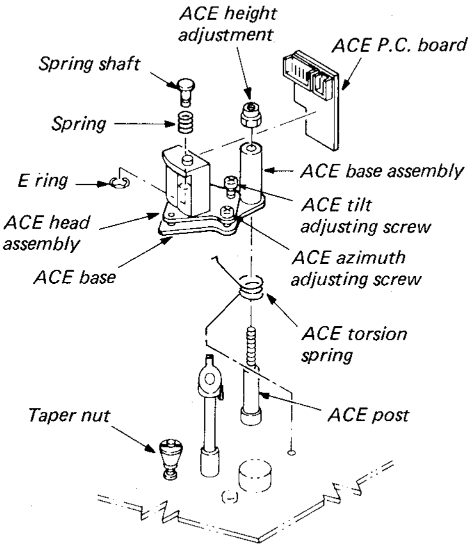

ACE height adjustment
ACE P.C. board
Spring shaft
Spring
E ring
ACE base assembly
ACE tilt adjusting screw
ACE head assembly
ACE base
ACE azimuth adjusting screw
ACE torsion spring
Taper nut
ACE post

Fig. 1-3-18 Replacement of ACE head assembly

Note:
When replacing the ACE head assembly, always use an ACE head with a green label. Do not use any other ACE head assembly.

(2) Guide sleeve replacement

<No. 3 guide sleeve replacement>

1. Rotate the No. 3 guide nut counterclockwise and remove the No. 3 guide nut and flange as shown in Fig. 1-3-21. When replacing a new flange, perform the previous steps in reverse order.
2. After the replacement, preset height of the lower flange as shown in Fig. 1-3-19, using the guide height gauge.
3. After completion of preset, perform adjustments by following the procedures for Linearity Adjustment, item 3) of the Tape Transport Adjustment. (Refer to 1-4-4 (2).)

Note:
The flange arranged in upper and lower positions are common parts and can be used in either place and upside down. (Fig. 1-3-21)

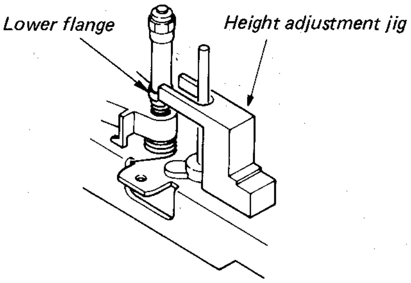

Lower flange
Height adjustment jig

Fig. 1-3-19 No. 3 guide preset

<No. 8 guide sleeve replacement>

1. Remove No. 8 cap through the No. 8 lower flange in this sequence as shown in Fig. 1-3-20. When reassembling, perform the previous steps in reverse order.

Note:
When mounting the No. 8 guide cap, mount with slant surface facing cassette side.

2. After completion of this replacement, perform adjustments by following the procedures for the linearity adjustment, item 3) of the transport adjustment. (Refer to 1-4-4 (2))

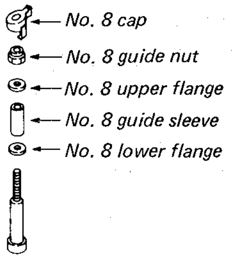

No. 8 cap
No. 8 guide nut
No. 8 upper flange
No. 8 guide sleeve
No. 8 lower flange

Fig. 1-3-20 No. 8 guide replacement

(3) FE head replacement

1. Disconnect the 2P connector of the FE head.
2. Remove the FE head mounting screw and the FE head can be removed. (Fig. 1-3-21)
3. Replace the new FE head and tighten the FE head mounting screw.
4. Connect 2P connector.
5. The replacement of the FE head causes little change in linearity. But confirm whether the associated adjustments have not been upset, starting check from the linearity adjustment, item 3) of the tape transport adjustment. (Refer to 1-4-4 (2).)

(4) Impedance roller replacement

1. Remove the washer and replace the impedance roller as shown in Fig. 1-3-21.

Note:
The polyslider must be inserted between the impedance roller and the entrance lever, take care not to miss it. An impedance roller with scratches may damage the tape, so handle it carefully.
If your fingers touch the surface of the impedance roller, clean the surface with alcohol.

2. After replacement of the impedance roller, perform the adjustment from the linearity adjustment, item 3) in the tape transport adjustment. (Refer to 1-4-4 (2).)

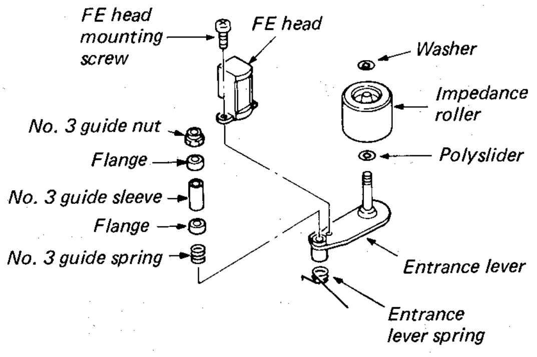


Fig. 1-3-21 Replacement of No. 3 guide and FE head

(5) S, T-guide rollers replacement

The same replacement procedures will be applied for both S and T-guide rollers.

1. Loosen the set screw shown in Fig. 1-3-22.
2. Turn the guide roller counterclockwise and remove it.
3. As the O-ring may stick to the guide roller when removed, remove the O-ring and install it on the new guide roller.
4. When remounting, perform the previous steps in reverse order.

Note:
When tightening the set screw, temporarily tighten it with light pressure. If it is tightened too hard, associated adjustments can not be made.
The T-guide roller has a black mark on upper flange. Do not exchange them when remounting.

5. After completion of the replacement, perform adjustment from the linearity adjustment item 3) in the tape transport adjustment. (Refer to 1-4-4 (2).)

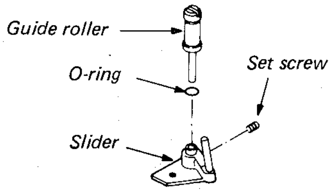


Fig. 1-3-22 Guide roller replacement

(6) S, T-sliders replacement

1. Remove the cylinder assembly.
2. Place the VCR vertically and remove the bottom cover.
3. Remove the connecting screw shown in Fig. 1-3-23.

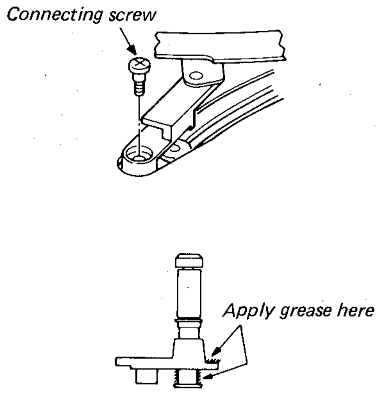


Fig. 1-3-23 S, T-slider replacement

4. Move the slider up to the loading position turning loading motor with your hand, and the slider can be removed.
5. Remove the guide roller and reinstall it in a new slider according to the steps stated in (5).
6. When replacing the slider, perform the previous steps in reverse order.
7. After completion of the replacement, perform adjustment from tape transport system adjustment.
   (Refer to 1-4-4 (2)).

Note:
When the slider is replaced, always apply grease to the slider as shown in Fig. 1-3-23.

(7) No. 9 guide lever assembly replacement

1. Remove the washer shown in Fig. 1-3-24.
2. Remove No. 9 guide lever assembly shown in Fig. 1-3-24.
3. When replacing, perform the previous steps in reverse order.

Note:
When mounting the No. 9 guide lever assembly, temporarily hook section A of No. 9 guide spring at the cutout on No. 9 guide lever and then insert the guide lever assembly into the pin. Then unhook the section A from the cutout.

4. After completion of the replacement, perform adjustment from the item 5) in the tape transport adjustment. (Refer to 1-4-4 (2)).

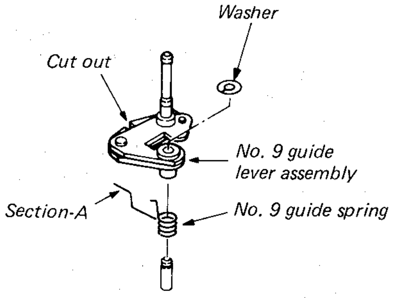

Washer
Cut out
No. 9 guide lever assembly
Section-A
No. 9 guide spring

Fig. 1-3-24 No. 9 guide lever replacement

1-3-4. Pinch Roller Assembly Replacement

1. Remove the washer (A) and disconnect the pinch connector from the pinch roller assembly.
2. Remove the washer (B) and remove the pinch roller assembly upward.
3. Clean the pinch post and apply grease on it.
4. Replace the pinch roller assembly according to the previous steps in reverse order.
5. After completion of the replacement, perform adjustment from item "1-4-4 (2) Tape transport system adjustment".

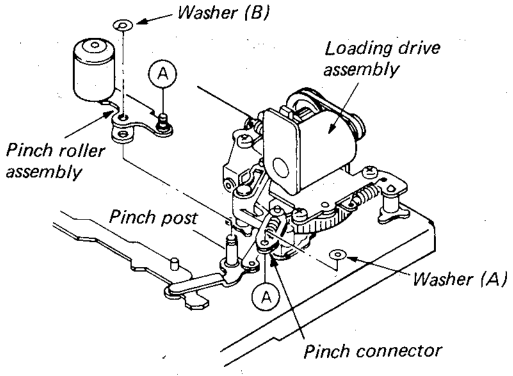

Washer (B)
Loading drive assembly
A
Pinch roller assembly
Pinch post
Washer (A)
A
Pinch connector

Fig. 1-3-25 Pinch roller replacement

1-3-5. Loading Motor Replacement

1. Remove the motor P.C. board from the motor, taking care not to damage wire leads.
2. Remove the washer (A) and disconnect the pinch connector.
3. Remove the cam lever stopper and the washer (B), and remove the cam lever assembly upward.
4. Turn the gear pulley in direction shown by the arrow until it stops to set the FF/REW mode. (Fig. 1-3-27)
5. Remove the screws (A) and remove the loading drive assembly.
6. Remove the loading belt and the screws (B), and remove the motor.
7. Replace the motor.
   When replacing with a new motor, perform the previous steps in reverse order, taking care of polarities (+ polarity should be located on upside).
8. When mounting the loading drive assembly on the main base, first push the logic slider to the right (shown by the arrow) until it stops, and then mount the drive assembly.
9. Confirm timing of the phase gear, referring to the item 1-4-1.

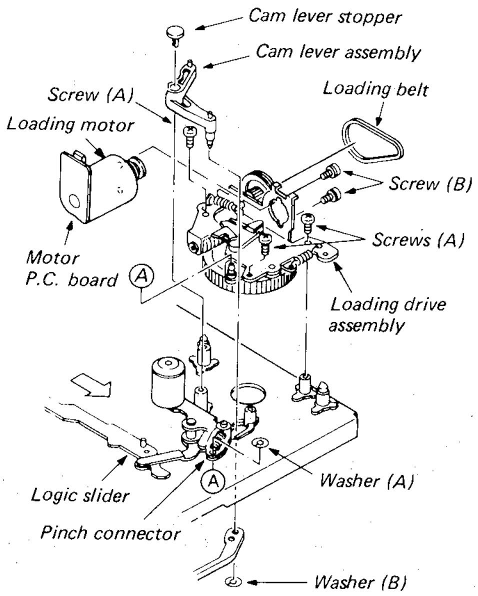

Cam lever stopper
Cam lever assembly
Screw (A)
Loading belt
Loading motor
Screw (B)
Screws (A)
Motor P.C. board
A
Loading drive assembly
Washer (A)
A
Logic slider
Pinch connector
Washer (B)

Fig. 1-3-26 Loading motor replacement

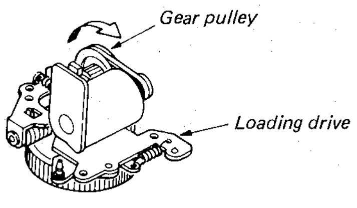

Gear pulley
Loading drive

Fig. 1-3-27 Loading drive . FF mode

Note:
When replacing the loading motor always use a loading motor with a label in green letters. Do not use any other motor.

1-3-6. Band Brake Assembly Replacement

1. Remove the S-soft brake assembly.
2. Remove a tension spring from a tension lever.
3. Remove the screw and remove the tension lever and the band brake assembly from the main base.
4. Remove the band brake assembly from the tension lever and replace the band brake assembly.
5. Clean the shaft of the tension lever and then apply one or two drops of oil. When replacing with a new band brake assembly, perform the previous steps in reverse order.
6. After completion of the replacement, check position of the tension pole and its adjustment (refer to item 1-4-2) and check the back tension (refer to item 1-4-3).

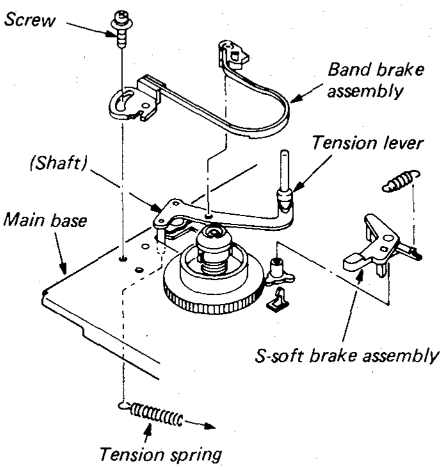

Screw
Band brake assembly
Tension lever
(Shaft)
Main base
S-soft brake assembly
Tension spring

Fig. 1-3-28 Band brake assembly replacement

1-3-7. Cam Switch Replacement

1. Remove the screw and the cam switch bracket.
2. To remove the cam switch, move it upward with a screwdriver while opening the claw of the cam switch bracket.
3. Perform the phase matching adjustment (timing check), referring to the item 1-4-1.
4. Replace the cam switch and mount it on the cam switch bracket.
5. When mounting the cam switch on the phase gear shaft, mount the cam switch while pushing the external rim of the cam switch in the direction shown by the arrow.
   (If the hole D of the cam switch and the cutout D of the phase gear shaft are not matched (overlapped), turn the cam switch until the hole D matches.)

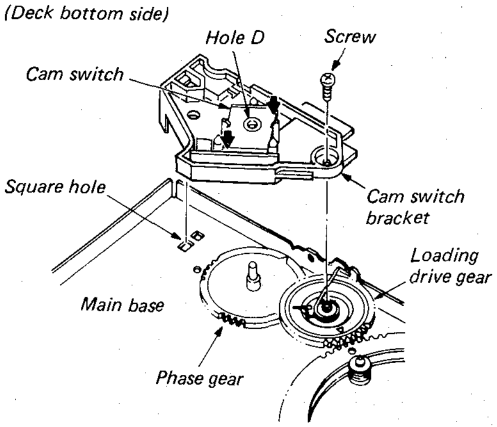

(Deck bottom side)
Hole D
Screw
Cam switch
Square hole
Cam switch bracket
Loading drive gear
Main base
Phase gear

Fig. 1-3-29 Cam switch replacement

1-3-8. T, S-Sensor Assemblies Replacement

1. Disconnect 3P and 6P connectors in T-sensor assembly, and 4P connector in S-sensor assembly.
2. Remove the screws.
3. Remove the sensor assemblies.
4. When reinstalling a new sensor, perform the previous steps in the reverse order.

Note:
Since the Hall element is glued on the sensor holder, take care the hall element is not torn off during installation.

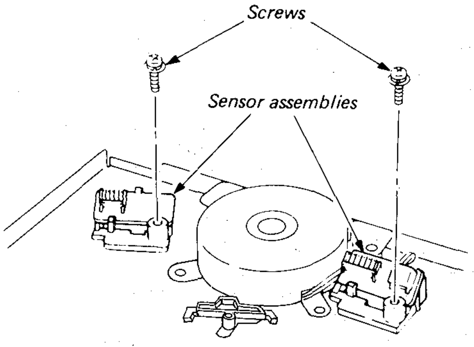

Screws
Sensor assemblies

Fig. 1-3-30 Sensor assemblies replacement

1-3-9. Main Brake Assembly Replacement

1. The brake assembly has the mold claws which allow one touch installation or removal.

Note:
When replacing, take care not to touch the brake pad surface.

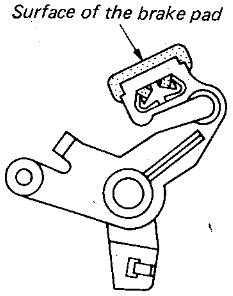

Surface of the brake pad

Fig. 1-3-31 Main brake assembly replacement

1-3-10. Ground Brush Replacement

1. Remove a screw and the brush.
2. Clean the ground cap with alcohol.
3. Replace the brush.
   Mount a new brush so that it can contact the center of the ground cap.

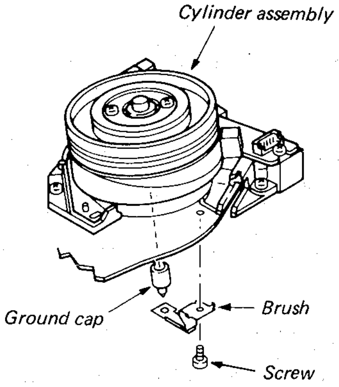

Cylinder assembly
Ground cap
Brush
Screw

Fig. 1-3-32 Brush replacement

1-3-11. Reel Table Replacement

(1) Supply reel table assembly

1. Remove the S-soft brake spring from the S-soft brake. (Fig. 1-3-33)
2. Remove the S-soft brake.
3. Remove the tension spring from the tension lever.
4. Remove the screw (A), then remove the tension lever and the band brake assembly.

Note:
Take care not to damage the mold claw of the band brake.

5. Remove the washer (A), then remove the S-reel table assembly upward paying attention not to miss the spacers.

Note:
Move the S-brake assembly in the direction shown by the arrow before removing the reel table. Take care not to touch the pad surface of the S-brake. (Fig. 1-3-34)

6. After cleaning the reel shaft with a cleaning kit, lubricate it with one or two drops of oil (lubrication kit).
7. When reinstalling the S-reel table assembly, temporarily move the S-brake assembly in the direction shown by the arrow, using a tweezer. (Fig. 1-3-34)

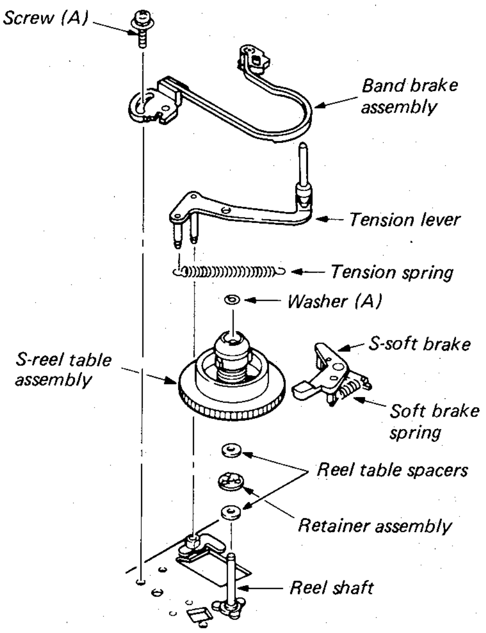

Screw (A)
Band brake assembly
Tension lever
Tension spring
Washer (A)
S-soft brake
S-reel table assembly
Soft brake spring
Reel table spacers
Retainer assembly
Reel shaft

Fig. 1-3-33 Supply reel table assembly replacement

8. Replace the spacers and the retainer assembly on the reel shaft when mounting the reel table on the deck.
9. Mount the tension lever and band brake assembly.

Note:
The mold claw of the band brake can be engaged smoothly into the hole of tension lever by pushing it slightly. Take care not to deform the mold claw and the tension lever by forcing them.

10. Hook the tension spring onto the tension lever.

Note:
In this case, take care not to give permanent deformation to the spring.

11. Mount the S-soft brake.
12. Mount the soft brake spring.

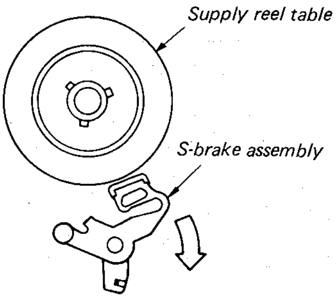

Supply reel table
S-brake assembly

Fig. 1-3-34 S-brake assembly

(2) Take-up reel table assembly

1. Remove the reverse brake spring from the reverse brake assembly.
2. Remove the reverse brake assembly from the main base.
3. Remove the T-soft brake spring from T-soft brake assembly.
4. Remove the T-soft brake assembly from the main base.
5. Remove the washer (A), then move the T-brake assembly in the direction shown by the arrow before removing the T-reel table assembly. Take care not to touch the pad surface of T-brake assembly.
6. As the bearing is stained with oil, the reel table spacers and thrust washer may stick to the T-reel table assembly and be removed with it. Take care not to miss them.
7. Clean the reel shaft using a cleaning kit, and apply one or two drops of oil (lubrication kit) after the reel shaft has dried.
8. Replace the take-up reel with a new one.
9. When mounting the take-up reel table, move the T-brake assembly in the reverse direction shown by the arrow with tweezers.
10. Replace the spacers and the thrust washer on the reel shaft when the reel table mounts on the deck.

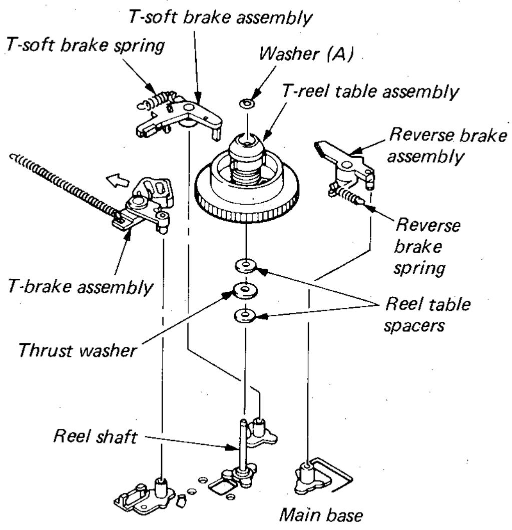

T-soft brake assembly
T-soft brake spring
Washer (A)
T-reel table assembly
Reverse brake assembly
Reverse brake spring
T-brake assembly
Reel table spacers
Thrust washer
Reel shaft
Main base

Fig. 1-3-35 Take-up reel table assembly replacement

1-3-12. Idler Assembly Replacement

Assume the front loading assembly is removed.

1. Removal of reel motor assembly (Fig. 1-3-36)
   Turn over the deck, and remove two screws (A) and two screws (B). Disconnect the 3P connector of the reel motor from the T-sensor assembly. Move the idler assembly in the direction shown by the arrow, then lift the reel motor assembly in the directions shown by the arrow to remove it.

After the reel motor is replaced, be sure to make adjustment of the reel torque referring to the item (2) in 1-4-3.

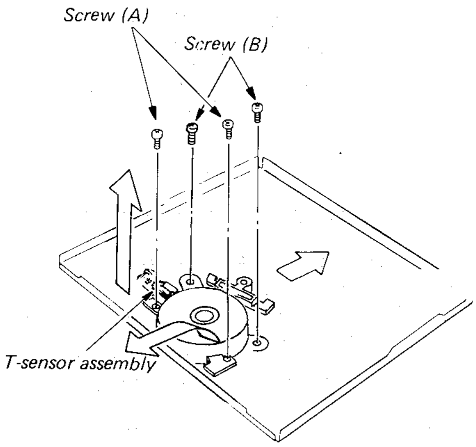

Screw (A)
Screw (B)
T-sensor assembly

Fig. 1-3-36 Removal of reel motor assembly

Notes:

* Before remounting, always clean knurling surface of the motor pulley, using the cleaning kit. This is to prevent oil, dust, etc. from sticking on surface of the idler rubber.

* Screws (A) and (B) are different in length.

2. Removal of idler stop bracket. (Fig. 1-3-37).
   Remove two screws (A), then remove the idler stop bracket.

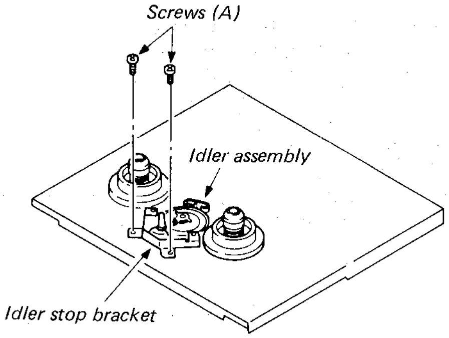

Screws (A)
Idler assembly
Idler stop bracket

Fig. 1-3-37 Removal of idler stop bracket

3. Remove the T-reel table assembly as previously stated. (Refer to 1-3-11 (2)).
4. Remove the polyslider. (Fig. 1-3-38)
5. Remove the idler spring from the post.
6. Move the idler assembly in the direction as shown by the arrow. (Fig. 1-3-38).

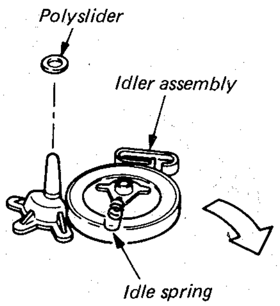


Fig. 1-3-38 Idler assembly replacement (1)

7. Confirm that the idler assembly is not caught with the main base. Lift the idler assembly upward.
8. When mounting, perform the previous steps in reverse order.
9. When mounting the idler assembly, be sure to grease. (Fig. 1-3-40)

Note:
Be sure to confirm that grease does not stain the rubber when the idler swings. Excessive amount of grease applied may stain the rubber.

10. Be sure to clean the idler rubber with the cleaning kit.

Note:
Make sure that the idler rubber is not stained with oil and dust. If stained, tape winding trouble may occur.

11. When assembling, perform the previous steps in reverse order.
    When the idler assembly was replaced, make sure to check reel torque adjustment referring to 1-4-3 (3).

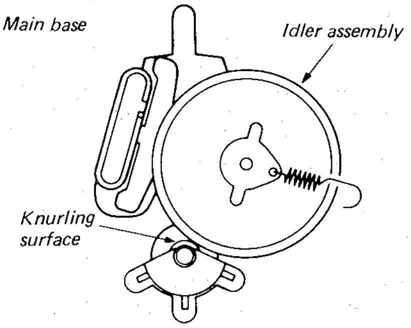


Fig. 1-3-39 Idler assembly replacement (2)

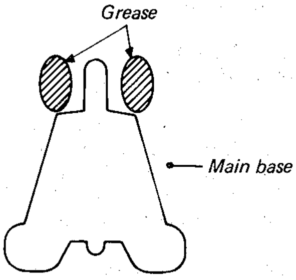


Fig. 1-3-40 Idler assembly replacement (3)

1-3-13. Capstan Motor Replacement

1. Remove the 6P connector from the capstan motor. (Fig. 1-3-41).
2. Remove the No. 9 guide lever assembly. (Refer to 1-3-3 (7))
3. Remove three screws and then the capstan motor. (Fig. 1-3-42)
4. Replace the capstan motor with a new one and mount it using the previous steps in reverse order.

Note:
After the capstan motor is replaced, check the tape transport system, referring to 1-4-4.

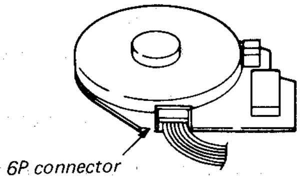


Fig. 1-3-41 Capstan motor replacement (1)

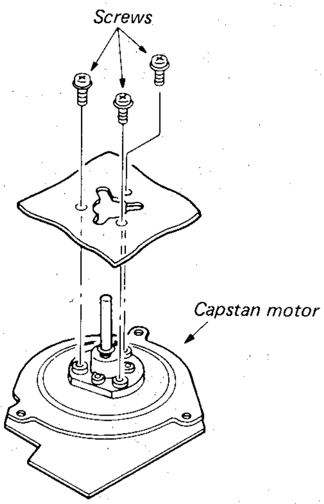


Fig. 1-3-42 Capstan motor replacement (2)

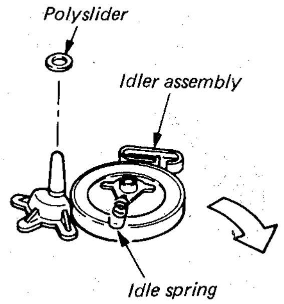


Fig. 1-3-38 Idler assembly replacement (1)

7. Confirm that the idler assembly is not caught with the main base. Lift the idler assembly upward.
8. When mounting, perform the previous steps in reverse order.
9. When mounting the idler assembly, be sure to grease. (Fig. 1-3-40)

Note:
Be sure to confirm that grease does not stain the rubber when the idler swings. Excessive amount of grease applied may stain the rubber.

10. Be sure to clean the idler rubber with the cleaning kit.

Note:
Make sure that the idler rubber is not stained with oil and dust. If stained, tape winding trouble may occur.

11. When assembling, perform the previous steps in reverse order.
    When the idler assembly was replaced, make sure to check reel torque adjustment referring to 1-4-3 (3).

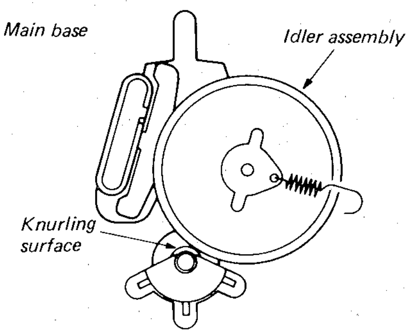


Fig. 1-3-39 Idler assembly replacement (2)

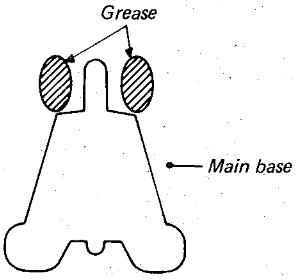


Fig. 1-3-40 Idler assembly replacement (3)

1-3-13. Capstan Motor Replacement

1. Remove the 6P connector from the capstan motor. (Fig. 1-3-41).
2. Remove the No. 9 guide lever assembly. (Refer to 1-3-3 (7))
3. Remove three screws and then the capstan motor. (Fig. 1-3-42)
4. Replace the capstan motor with a new one and mount it using the previous steps in reverse order.

Note:
After the capstan motor is replaced, check the tape transport system, referring to 1-4-4.

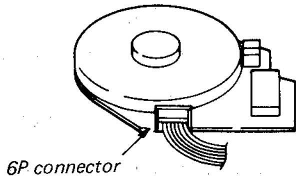


Fig. 1-3-41 Capstan motor replacement (1)

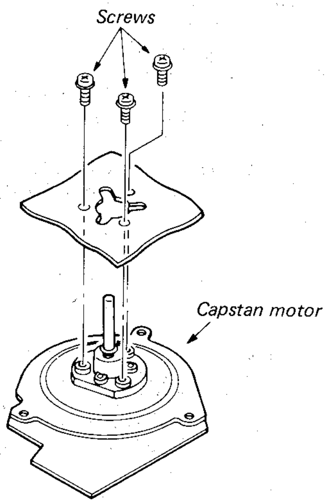


Fig. 1-3-42 Capstan motor replacement (2)

1-4. Check and Adjustment

1-4-1. Timing Check

(1) Cam gear and phase gear

1. Make sure the C-hole on the main base lines up with the holes on the cam gear and the loading drive base, if not, rotate the gear pulley assembly of the loading drive fully in the direction shown by the arrow to set FF mode. (Fig. 1-3-27)
2. Confirm the arrow mark of the phase gear is also aligned with the V-slot. If not aligned, adjust the timing by remounting the phase gear.

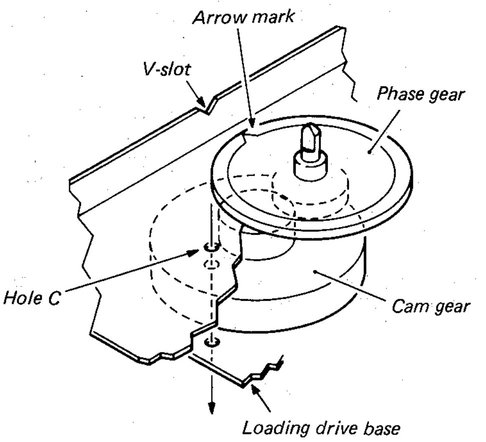

Arrow mark
V-slot
Phase gear
Hole C
Cam gear
Loading drive base

Fig. 1-4-1 Cam gear/phase gear

(2) Loading ring and loading drive gear

1. Make sure through the main base hole that holes of the S-loading ring and the T-loading ring are overlapped as shown by the arrow A. If they are not overlapped, adjust the location by removing the loading ring gear B.
2. Also make sure that the B-hole on the S-loading ring is coincided with the delta mark on the loading drive gear under the condition in the step 1 above. If they are not coincided, adjust the timing (location) by remounting the loading drive gear.

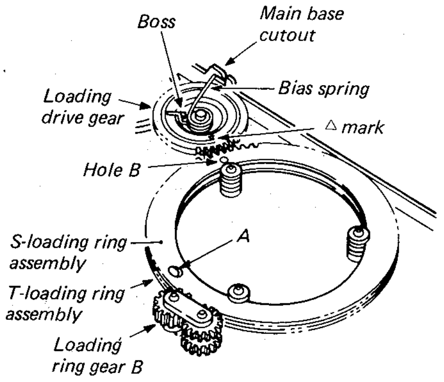

Boss
Main base cutout
Loading drive gear
Bias spring
△ mark
Hole B
S-loading ring assembly
A
T-loading ring assembly
Loading ring gear B

Fig. 1-4-2 Loading ring assembly/ loading drive gear

(When remounting the loading drive gear, make sure one end of the bias spring is hooked on the main base cutout and the other end is hooked on the boss of the loading drive gear.)

1-4-2. Check and Adjustment of Tension Pole Position

1. Set the deck to play mode with the front loading assembly removed.
2. Make sure the center of the tension pole is in alignment with the left edge of No. 1 guide post (±1mm) as illustrated.
3. If necessary, loosen the screw (A) and adjust the mounting position of the band bracket.

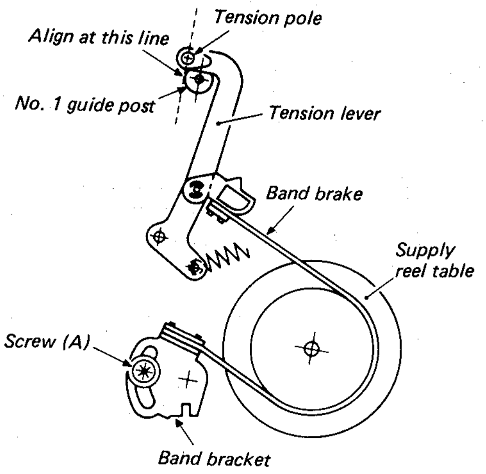

Tension pole
Align at this line
No. 1 guide post
Tension lever
Band brake
Supply reel table
Screw (A)
Band bracket

Fig. 1-4-3 Tension pole position

1-4-3. Reel Torque

(1) Reel torque

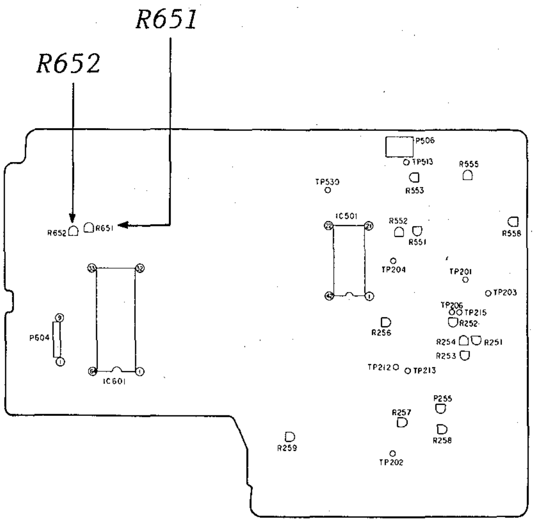
1. When in REVIEW mode
   Excessive torque will cause damage to the tape during REVIEW mode, while poor torque may not wind the tape.
2. Record/Playback (take-up side) mode
   Too little torque does not rewind the tape to the end. If too large the tape may be stretched by excessive tension.
3. FF mode (take-up side)
   REW mode (supply side)
   Too little torque does not rewind the tape to the end or takes too much time to rewind.
4. Inspection
   Rewind the torque cassette to the end, then check the torque values shown below.
   Record/Playback 70 - 90g-cm
   Review 190 ± 10g-cm

Notes:

* If the reel torques are out of limits, clean the rubber surface of the idler assembly, the reel motor pulley, the reel table assembly, etc.
* Replace the idler assembly, if its rubber is hardened or worn out.
* Replace the brake pad of the main brake, if it is worn out.
* If the specified torque value is not obtained, replace the reel idler assembly.

(2) Reel torque adjustment

1. First, record a TV broadcast program on the entire torque cassette tape (KT-300NR).
2. Load a torque cassette in the VTR and feed forward the tape before proceeding with measurement.
   Connect test pins TP509 and TPG51 temporarily.
3. Set the VTR to the REVIEW mode and adjust R651 until the REVIEW take-up torque of 190 ± 5g-cm is obtained while observing the left torque meter.
4. Disconnect pins TP509 and TPG51 connected previously. After completion of step 3, set the VCR to the PLAY mode.
   In this case, push the STILL/PAUSE button as soon as the play mode has been set. Wait several seconds and then set the VTR to the PLAY mode again.
   Read the right torque meter and adjust R652 so that the PLAY take-up torque of 80 ± 10g-cm is obtained.
5. When the reel motor assembly or the idler assembly is replaced, perform confirmation and adjustment of the reel torque. Perform the reel torque adjustment in the order of item 3 and 4.
   Torque value will change if the confirmation is performed in the reverse order.
6. Confirmation and adjustment of the back tension will be performed with the front loading mechanism removed from the set and terminals 1 and 6 of P604 (Main P.C. Board) short-circuited, using a back tension cassette gauge.
   First, make sure that the tension pole is positioned correctly by referring to (item 1-4-2).
   Load a back tension cassette and set the VTR to the PLAY mode.
   Make sure the meter is indicating 16 - 26 gf-cm.
   If the value is out of limit, first make sure the tension level spring is normal, and then replace the band brake assembly as required. (Refer to item 1-3-6).



Main P.C. Board

PRECAUTIONS FOR USE OF TORQUE CASSETTE (KT-300NR)

1. Before loading a torque cassette in a VTR, always remove tape slack. The tape slack can be removed by rotating the reel to its take-up direction. (The tape tends to slack when there is no reel brake actions.)
2. When the torque cassette is slotted in, confirm followings:
   a. Make sure the tape does not ride up or over the No. 8 cap. If it does, do not eject the tape but bring the tape to its correct position, taking care not to damage the tape.
   b. Make sure the tape is not slackened, if slackened, operate the VTR in FF or REW mode and then stop the tape. Then make sure the tape is not slackened again.
   c. After above confirmation, proceed to the reel torque adjustments and confirmation.
3. Cautions for removal of torque cassette
   a. When removing the torque cassette from the VTR, set the VTR to the STOP mode and wait for several seconds. Then, make sure the tape is not slackened. Push the EJECT button to remove the cassette.
   b. When removing the torque cassette from the VTR, also make sure the tape is not slackened inside the cassette lid before pulling the cassette from the VTR. If the tape is slackened inside the lid, carefully bring the tape in place and then pull the cassette.
4. Cautions for playback operation
   a. When making adjustments and confirmation in the PLAY mode, first push the PLAY key, and then push STILL/PAUSE key to set the STILL mode. Run the VTR for several seconds in the STILL mode. Release the STILL mode and set the PLAY mode.
      Perform the reel torque adjustment and confirm all functions work properly.
5. If the previous precautions 1, 2, 3 and 4 are not performed properly, the tape may be damaged and correct measurements can not be performed.
6. Do not use worn out or damaged tape, if used they may damage video heads on the cylinder. In such a case always replace the tape with a new one.
   The replacement tape is of E-120 type, 6.01m ± 0.3m in length.

1-4-4. Tape Transport System

The tape transport system has been precisely adjusted in the factory, so no check and alignment are necessary except the followings:

* Noises observed on the screen
* Tape damage
* Parts, shown in the adjustment procedures for the tape transport system, item 1-3-3, were replaced.

<Adjustment reference>

Lower flange height of No. 8 guide is used as the basic reference for the transport adjustment, so do not move the No. 8 guide except replacing the No. 8 guide sleeve.

(1) Location of tape transport adjustment

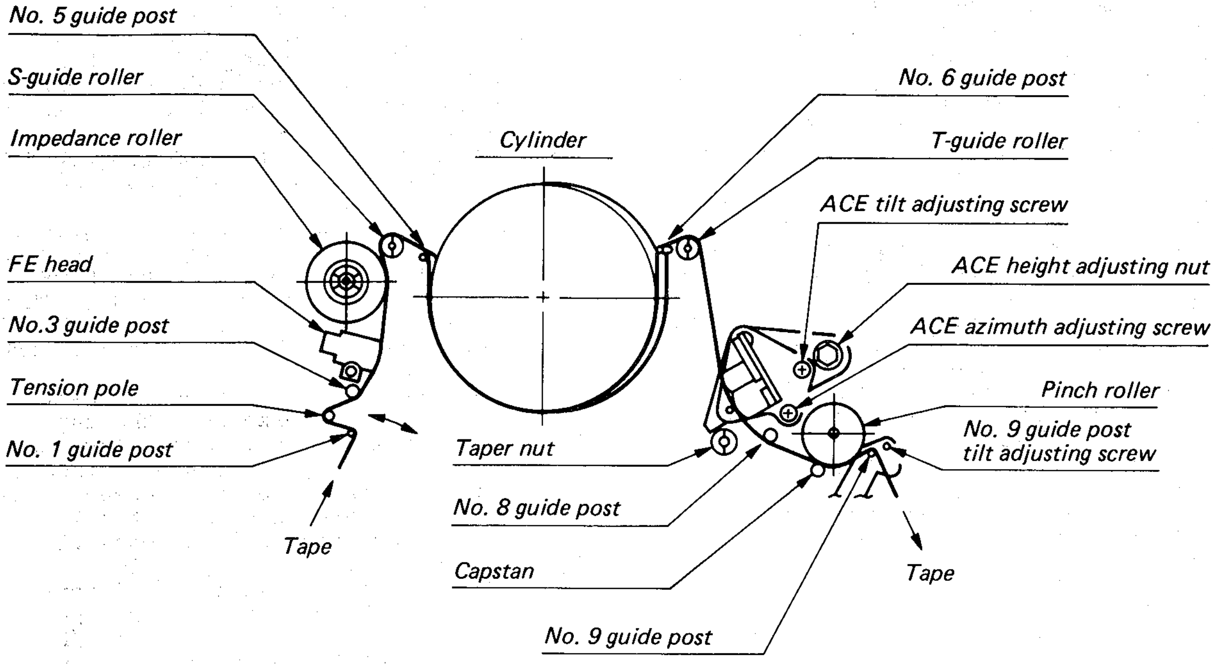

No. 5 guide post
S-guide roller
Impedance roller
FE head
No.3 guide post
Tension pole
No. 1 guide post
Tape
Cylinder
Taper nut
No. 8 guide post
Capstan
No. 9 guide post
No. 6 guide post
T-guide roller
ACE tilt adjusting screw
ACE height adjusting nut
ACE azimuth adjusting screw
Pinch roller
No. 9 guide post tilt adjusting screw
Tape

Fig. 1-4-4 Location of tape transport adjustment

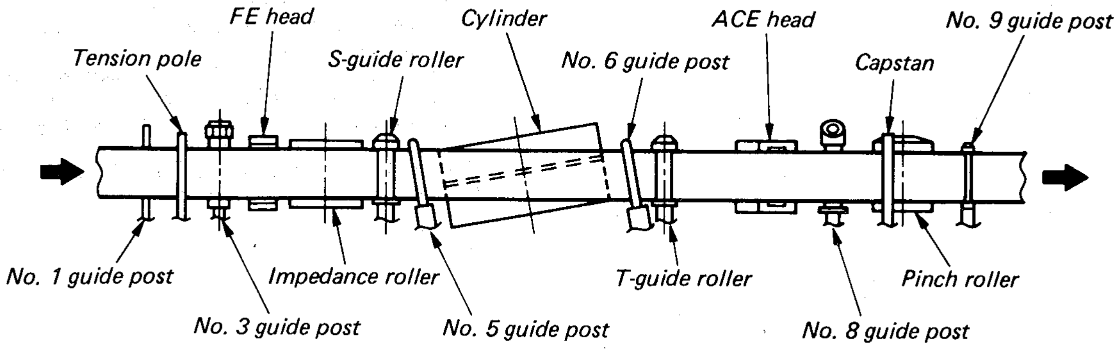

FE head
Cylinder
ACE head
No. 9 guide post
Tension pole
S-guide roller
No. 6 guide post
Capstan
No. 1 guide post
Impedance roller
T-guide roller
Pinch roller
No. 3 guide post
No. 5 guide post
No. 8 guide post

Fig. 1-4-5 Tape travel diagram

(2) Tape transport system adjustment

* Pre-adjustment

When the part(s) listed in Table 1-4-1 is replaced, perform required adjustments by referring to procedures for the tape transport system.

When the part(s) listed in Table 1-4-1 is replaced, the tape path may be changed and may damage alignment tape. To prevent this, first run a E-240 tape and make sure excessive tape wrinkle does not occur at each tape guide.

1. If tape wrinkle is observed at the No. 3 guide, make sure of the preset height of the guide again.
2. If tape wrinkle is observed at the S, T-guide rollers, turn the S, T-guide rollers until wrinkle disappears.

Table 1-4-1

Part replacement	Adjustment procedure
* Cylinder complete assembly * S, T sliders * ACE head assembly * Capstan motor assembly * Pinch lever assembly * Cylinder motor	From item 1)
* Upper cylinder	From item 2)
* S, T guide rollers * Tension lever assembly * Impedance roller * FE head * No. 3 guide sleeve	From item 3)
* Reel motor sub-assembly * Reel table (S, T) * Taper nut	From item 4)
* No. 9 guide lever	From item 5)

* Adjustment procedures

1) ACE head assembly adjustment

a. ACE tilt adjustment

1. Play back a E-240 tape and observe running condition of the tape at the lower flange of No. 8 guide.

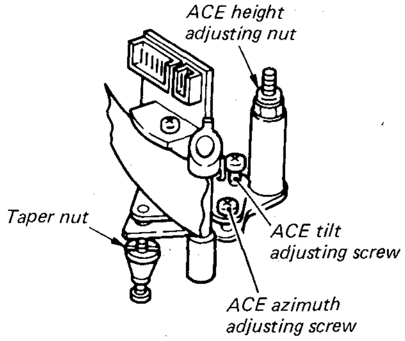


Fig. 1-4-6 ACE head assembly

2. Adjust the ACE tilt adjusting screw until tape wrinkle is caused at the lower flange of No. 8 guide as shown in Fig. 1-4-7(a).
3. Turn the ACE tilt adjusting screw counterclockwise until the tape travels along the lower flange as shown in Fig. 1-4-7(b).

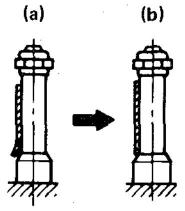


Fig. 1-4-7 No. 8 guide check

b. Audio azimuth adjustment

1. Play back the alignment tape, 7 kHz portion of audio signals.
2. Connect a millivoltmeter to the audio line output terminal.
3. Turn the ACE azimuth adjusting screw to obtain maximum audio output.

c. Audio head height adjustment

1. Run the alignment tape in the playback mode.
2. Observe surface of the audio head using a dental mirror.
3. White ceramic is provided on both sides of the audio and control heads of the ACE head assembly.
   Turn the ACE height adjusting nut so that lower tape edge matches to the upper edge of the ceramic on the lower head.
   If the previous method is deficient, play back the 400 Hz portion of the alignment tape and adjust for maximum audio output.

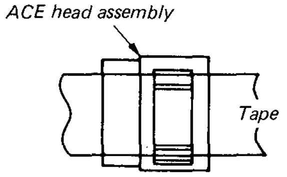


Fig. 1-4-8 Head height

d. ACE head position pre-adjustment

Note:
Before proceeding with this adjustment, remove adhesive cement applied on the taper nut.

1. Play back the alignment tape.
2. Adjust the taper nut for maximum video envelope output after the tracking control is set at its center position.

2) Servo circuit adjustment

Proceed to PG1, PG2 and Tracking adjustments for servo circuit in "2. ELECTRICAL ADJUSTMENT".

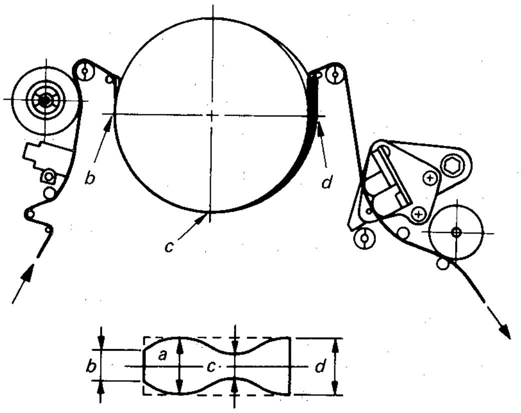
3) Linearity adjustment
(S, T-guide rollers adjustment)

1. Play back the alignment tape.
2. Observe the signal video envelope on an oscilloscope display triggered by the video switching pulse.
3. Make sure the video envelope waveform (in its maximum output) meets the specification shown in Fig. 1-4-9. If not, adjust as follows:

Note:

a = maximum output of the video envelope
b = minimum output of the video envelope at the entrance side
c = minimum output of the video envelope at the center point
d = minimum output of the video envelope at the exit side

4. In the same way check the envelope.



$c/a \geqq 0.75 : b, d/a \geqq 0.63$

Fig. 1-4-9 Envelope waveform adjustment

5. If the A section in Fig. 1-4-10 does not meet the specification, adjust the S-guide roller in up or down direction.
6. If the B section in Fig. 1-4-10 does not meet the specification, adjust T-guide roller in up or down direction.

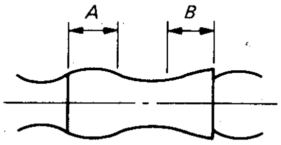


Fig. 1-4-10 Adjustment points

7. After completion of the adjustment(s), turn the tracking control and make sure video envelope variations are almost flat.
8. If the envelope varies as shown in Fig. 1-4-11, adjustment of the S, T-guide rollers may be upset, if so perform the adjustment again.

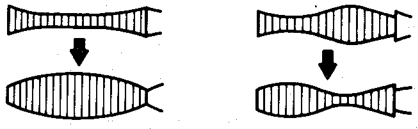


Fig. 1-4-11 Abnormal variation of the waveform

4) ACE head assembly fine adjustment

a. Tape wrinkle check at the lower flange of No. 8 guide

1. If tape wrinkle is observed at the lower flange of No. 8 guide, adjust the ACE tilt adjusting screw counterclockwise as shown in Fig. 1-4-6 until the wrinkle disappears.
2. If a gap is observed between the lower flange of No. 8 guide and the lower edge of tape, adjust the ACE tilt adjusting screw clockwise until the tape travels along the lower flange.

Note:

This adjustment should be made using a beginning part of E-240 tape.

b. Azimuth adjustment

1. Play back the 7 kHz audio signal on the alignment tape.
2. Adjust the ACE azimuth adjusting screw for maximum audio output as shown in Fig. 1-4-6.

c. ACE head position adjustment

1. Play back the alignment tape.
2. Place the tracking control at its center click position.
3. Trigger an oscilloscope with the video switching pulse and observe the video envelope waveform.
4. Turn the taper nut counterclockwise until the ACE base reaches the lower taper end of the taper nut as shown in Fig. 1-4-12.

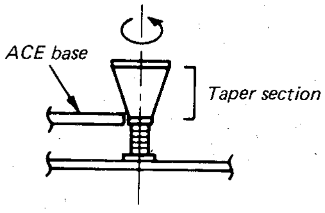


Fig. 1-4-12 Taper nut and ACE base

5. Turn the taper nut slowly counterclockwise and fix the taper nut at the position where the video envelope reaches a first peak level.
6. Play back the alignment tape.
7. Make sure the video envelope is at maximum with the tracking control set to the center click position.

Note:

* If video signal is not observed with the tracking control set to the center position, perform the video envelope adjustment to obtain maximum video envelope in each mode, again.

* If maximum video envelope deviates within ± 6msec from the tracking volume center, perform a fine adjustment with the alignment tape to output maximum video envelope. Play back the alignment tape, and check the video envelope waveform is maximum with the tracking control set to the center position. (Deviation of the maximum point should be within ± 2msec.)

8. Play back the alignment tape and make sure the audio output is maximum.

Note:
After completion of the ACE head position adjustment, the ACE base must be positioned at approximately the center of the taper nut as shown in Fig. 1-4-13.

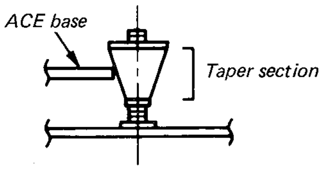


Fig. 1-4-13 Position of taper nut after adjustment

5) No. 9 guide lever adjustment

1. Set the VTR to Cue mode with E-240 tape loaded. Switch the Cue mode to the Review mode when the tape has been rewound into the T-reel table to some extent.
2. Check tape wrinkle at the upper and lower flange of No. 8 guide.
   If no tape wrinkle is observed along the lower flange, no adjustment is required.
3. If the tape runs along the upper flange or tape wrinkle occurs, turn the No. 9 tilting screw in Fig. 1-4-14 counterclockwise and adjust the screw until the tape runs along the lower flange.
4. If tape wrinkle occurs at the lower flange, turn the No. 9 tilting screw in Fig. 1-4-14 clockwise until tape wrinkle disappears.

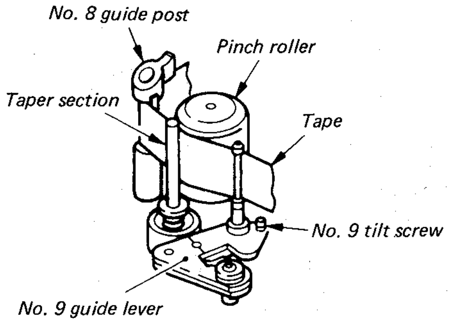


Fig. 1-4-14 No. 9 guide lever adjustment

6) Check for transitional operation from Review to Play

1. Play back the alignment tape in Review mode and observe the video envelope with an oscilloscope.
2. Switch the Review mode to the Play mode. When switched to the Play mode, make sure the entrance side envelope comes to an approximate steady state within 3 seconds as shown in Fig. 1-4-15.

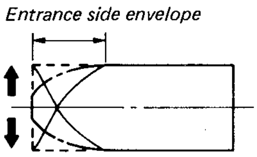


Fig. 1-4-15 Video envelope rising when operation mode is switch from review to play mode

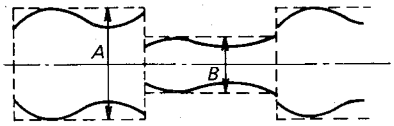
If it does not rise within 3 seconds, adjust as follows:

3. Turn the No. 3 guide nut counterclockwise to adjust the lower flange height as shown in Fig. 1-3-21.
   Make sure the tape travels along the lower flange.
4. Play back an alignment tape. Since entrance side linearity varies as the height of No. 3 guide varies, adjust the S-guide roller to correct the linearity.
5. Change operation mode from the Review to the Play mode again and make sure the entrance side envelope rises within 3 seconds. If not, perform the adjustment again from item 3.
6. Play back the E-240 tape in the Play mode and make sure no tape wrinkle occurs at the lower flange of the No. 3 guide.
   If the tape is raised too high at the No. 3 guide, the tape will be damaged. So if tape wrinkle occurs, turn the No. 3 guide nut clockwise until the wrinkle disappears and then perform adjustment from item 4.

Note:
If the rising characteristic is poor in Review mode, screen noises may occur in synchronous editing recording.
Perform the adjustment carefully.

7) Envelope check

1. Make recordings on E-180 and E-240 tapes, and make sure the playback output envelope meets the specification shown in Fig. 1-4-9.
2. In playback using the same video deck as used for the recording, (with a E-180) the video envelope should meet the specification shown in Fig. 1-4-16.
3. If the performance does not meet both specifications 1 and 2 above, replace the upper cylinder assembly.
4. Confirm operation of the synchronous editing, using a beginning position of a E-180 tape.
5. If picture noises are observed at the starting position of the editing, adjust the preset height of the No. 3 guide again.



- $B/A \geqq 0.55$
- $B \geqq 120mV$

Fig. 1-4-16 Envelope output and output level difference

8) Tape wrinkle check

1. Play back the E-240 tape in the playback, Cue, Review and the frame feeding mode, and observe tape wrinkle at each guide.
2. If excessive tape wrinkle is observed at the mode shown below, perform the associated adjustments also shown below.

a. Playback mode
. Tape wrinkle at the S, T-guide roller section
    Item 3: Linearity adjustment
  Tape wrinkle at No. 8 guide flange
    Item 3: Linearity adjustment
  Tape wrinkle at No. 3 guide flange
    Item 6: Check for transitional operations from Review to Play

b. Cue/Review mode
  Tape wrinkle at No. 8 guide
    Item 5: No. 9 guide lever adjustment

c. Frame feeding mode
  Tape wrinkle at No. 8 guide
    Item 3: Linearity adjustment

2. ELECTRICAL ADJUSTMENT

<Test equipment required>
Adjustment will be performed with the following test equipment.

1. Color TV (Monitor)
2. Oscilloscope, 2 CHs, 15 MHz or higher with delay system
3. Frequency counter (7 digits or higher)
4. Millivoltmeter
5. Digital voltmeter
6. Tester (20K ohm/V)
7. Audio generator
8. Audio attenuator
9. Alignment tapes
   Part code: ST-C1: 70909227
10. Alignment screw driver (jig)
11. Color pattern generator
12. Video sweep generator
13. Patch cord
    Part code: 70179076

<Color bar signal>
Color bar signals of 75% recorded on the alignment tapes are shown in Fig. 2-1-1.

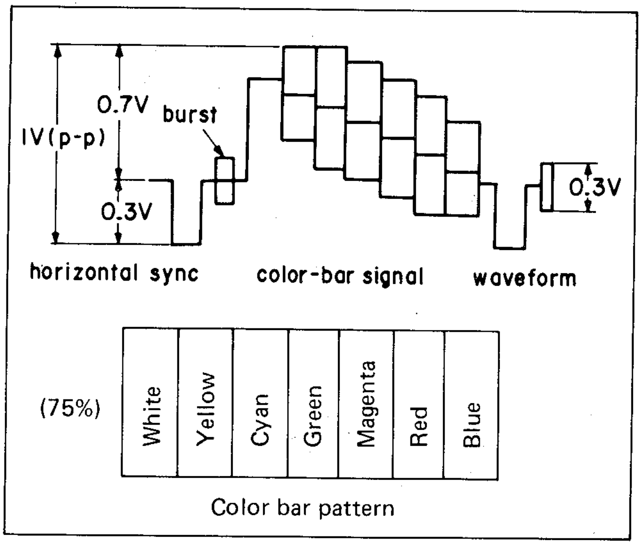


Fig. 2-1-1

<Specified input and output levels, and impedance>

Video input:	Negative sync, standard composite video signal 1Vp-p, 75 ohm
Video output:	Same as the video input. 1Vp-p, 75 ohm
Audio input:	-5 dBs, more than 10k ohm
Audio output:	-5 dBs, less than 1k ohm

<Alignment sequence>

Proceed the alignments in the sequence as shown in Fig. 2-1-2.

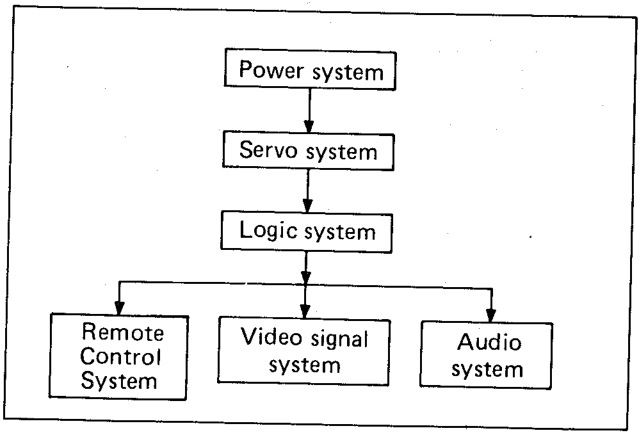
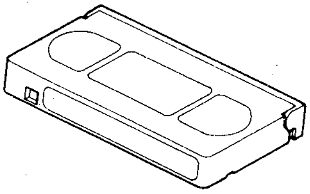

Power system
Servo system
Logic system
Remote Control System
Video signal system
Audio system

Fig. 2-1-2

Alignment tape specifications



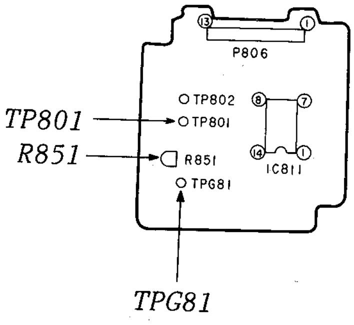
ST-C1

Segment	Mode	Playback Time (min.)	Video Signal	Audio Signal	Applications
1	PAL & SECAM	10	Mono Scope	1 kHz	Servo checks and adjustment
2	PAL & SECAM	10	3 MHz A-ch	400 Hz, 7 kHz	Tape path checks and adjustment
3	PAL	5	Color Bar	3 kHz	Video and Sound checks and adjustment
4	SECAM	5	Color Bar	3 kHz	Video and Sound checks and adjustment
5	MESECAM	5	Color Bar	3 kHz	Video and Sound checks
6	NTSC	5	Color Bar	1 kHz	Video and Sound checks

2-1. Power Supply Circuit

2-1-1. +12V adjustment

1. Connect the power plug to AC input rated voltage.
2. Set VTR to REC mode.
3. Connect DC voltmeter to TP801 (+12V) and TPG81 (GND).
4. Adjust trim pot R851 to obtain 12.0 ± 0.1V.

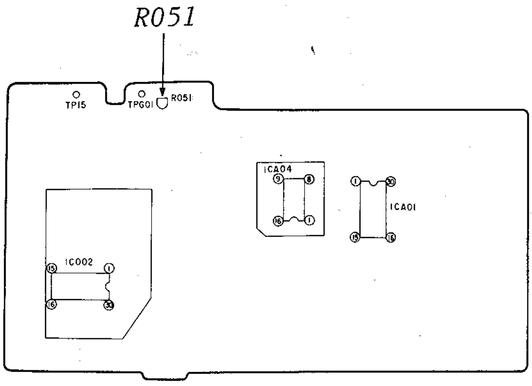

⑬
①
P806
TP802
⑧
⑦
TP801
TP801
R851
R851
⑭
①
IC811
TPG81
TPG81

Power 2 P.C. Board

2-2. PIF, Selector Circuit

2-2-1. AGC delay

1. Temporarily turn R051 fully clockwise.
2. Turn R051 slowly counterclockwise for minimum noise and sound buzz.

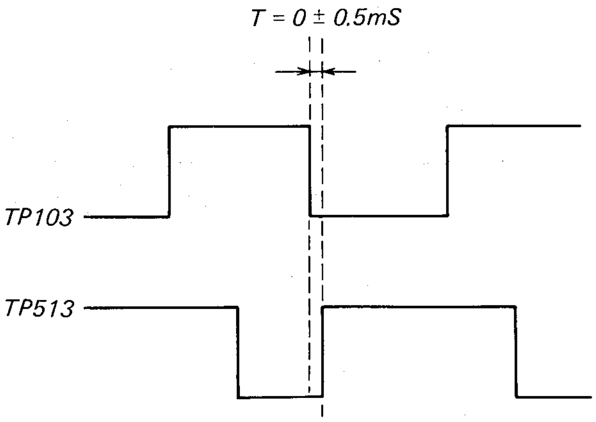

R051
TP15
TPG01
R051
ICA04
ICA01
IC002

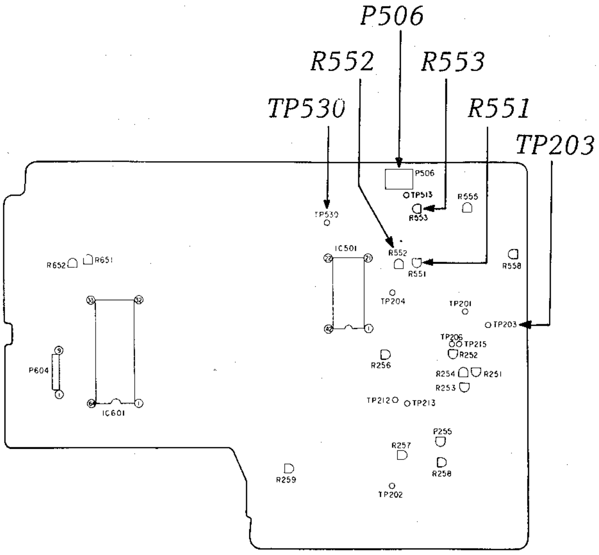
PIF P.C. Board

2-3. Servo Circuit

2-3-1. Tracking

1. Place the tracking control in the center click position.
2. Play back a recorded tape.
3. Set the oscilloscope to the chop mode.
4. Connect the A-CH input to pin 4 of P506 (SW pulse) and the B-CH to pin 2 of P506 (CTL pulse). Trigger the oscilloscope with the SW pulse.
5. Adjust R553 so that T becomes 0 ± 0.5ms as illustrated.

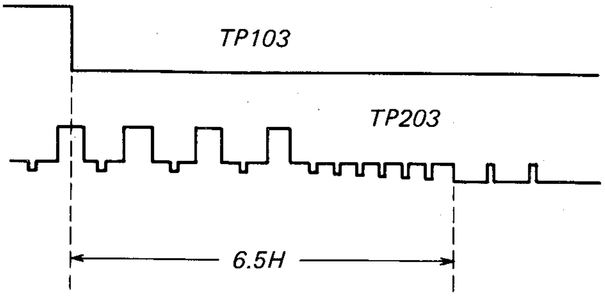

T = 0 ± 0.5mS
TP103
TP513


P506
R552
R553
TP530
R551
TP203
TP513
R555
IC501
R558
R652
R651
TP204
TP201
P604
IC601
R256
R254
R251
R253
R252
TP215
TP212
TP213
R255
R257
R258
R259
TP202

Main PC Board

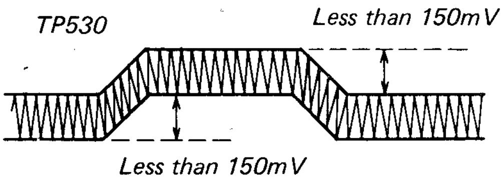
2-3-2. Playback phase (PG1)

1. Playback the alignment tape (ST-C1: PAL mode). (Tracking control knob at its center click position)
2. Set the oscilloscope to the chop mode, and externally trigger the scope with the SW pulse.
   Connect the A-CH input to the SW pulse (Pin 4 of P506) and the B-CH to the video signal (TP203).
3. Adjust R551 to position the falling edge of the SW pulse at 6.5H ± 0.5H from the V-sync front edge of the video signal.


TP103
TP203
6.5H

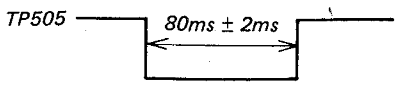
2-3-2. Playback phase (PG2)

1. Always perform this adjustment after the adjustment 2-3-1 has been completed.
2. Play back a recorded tape.
3. Set the oscilloscope to the chop mode and connect the A-CH input to pin 4 of P506 (SW pulse) and the B-CH to TP530 (cylinder motor drive voltage). Trigger the A-CH with the SW pulse.
4. Adjust R552 for minimum voltage ripple (less than 150mV).


TP530
Less than 150mV
Less than 150mV

2-3-4. Slow tracking

1. Place the slow tracking control in the center click position.
2. Play back a recorded tape.
3. Adjust R555 so that the falling part of the slow tracking pulse at TP505 shows 80ms ± 2ms.

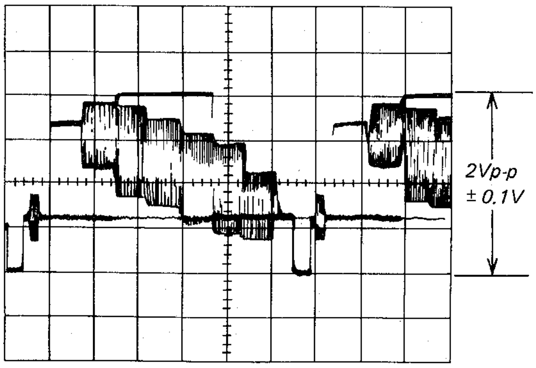


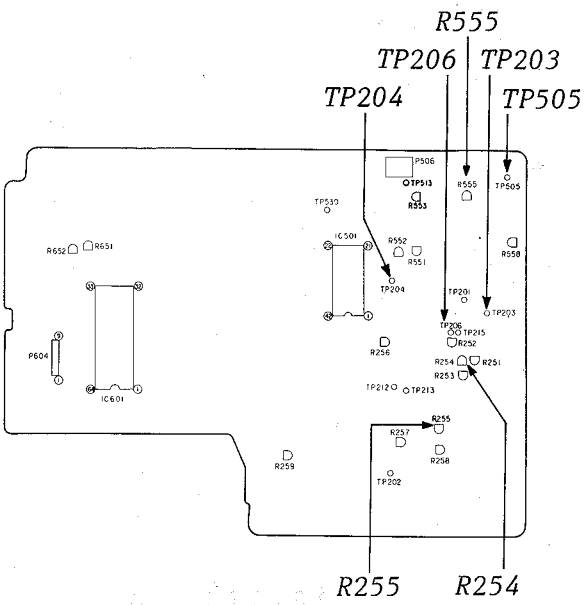
2-4. Video, Video 2 Circuit

Note:
- * Place the HQ/EDIT/HQ PRO switch in the HQ position.
- * Set the channel to "0" when feeding signal to LINE terminals.

2-4-1. EE output level

1. Feed a color bar signal to the line input terminals and set the VTR to the EE mode.
2. Connect the oscilloscope to TP203 and trigger the scope with HD pulse at TP204. Adjust the scope so that a waveform is displayed for 2H period.
3. Adjust R255 until amplitude of 2.0Vp-p ± 0.1V is obtained between sync tip and 100% white level.

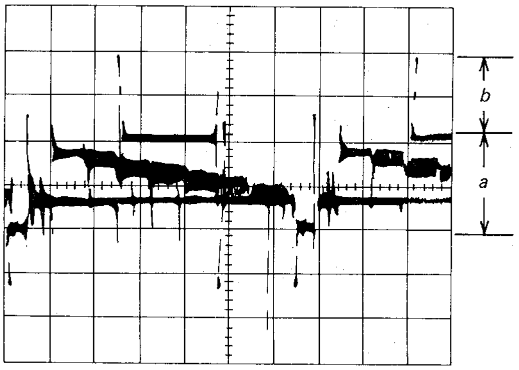




Main P.C. Board

2-4-2. White clip

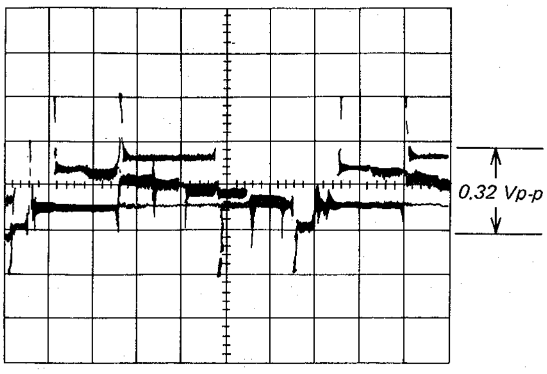
1. Feed the PAL color bar signal to the line input terminals and set the VTR to the EE mode.
2. Connect the oscilloscope to TP206 and trigger the scope with HD pulse at TP204. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R254 so that overshoot appearing the white peak side shows 90% ± 5% of the Y signal level.



a : b = 100 : 90

2-4-3. FM deviation

1. Feed the color bar signal to the line input terminals.
2. Connect the oscilloscope to TP215 and trigger the scope with a composite sync signal at TP204. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R252 to obtain the amplitude of approx. 0.32Vp-p between the sync tip and the white peak. After adjusting R256 (Playback Y signal output level) with the method 2-4-6, repeat above adjustment procedures, and then adjust R252 (FM deviation control) so that the playback Y signal output level at TP203 shows 2.0 ± 0.15Vp-p.



Horizontal axis: 10µs/div.
Vertical axis: 0.1V/div.

2-4-4. Sync tip frequency

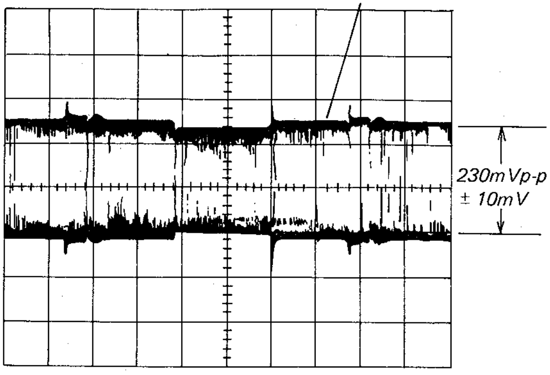
1. Short circuit the line input terminals with a phono jack and set the VTR to the REC mode.
2. Connect the frequency counter to TP202.
3. Adjust R251 to obtain frequency reading of 3.85 ± 0.1MHz.

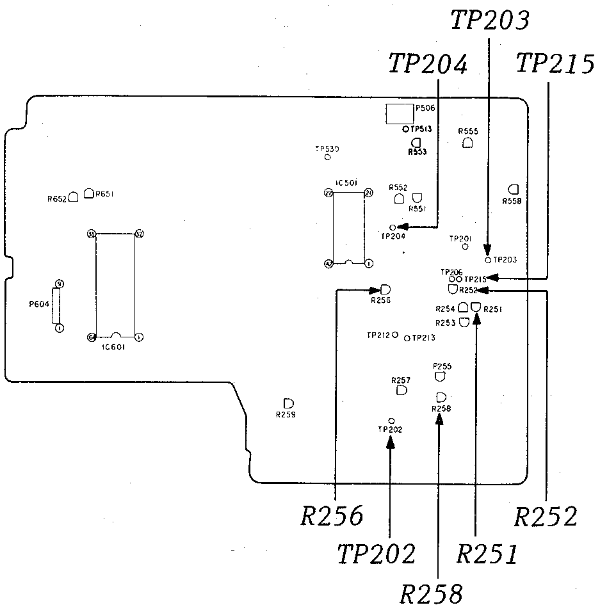
2-4-5. REC FM level

1. Feed a color bar signal to the line input terminals and set the VTR to the REC mode.
2. Connect the oscilloscope to TP202 and trigger the scope with HD pulse at TP204. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R258 so that amplitude of 100% white portion shows 230mVp-p ± 10mV.

TP202 (REC FM)

Ignore this part appearing dimly because it is a color signal.

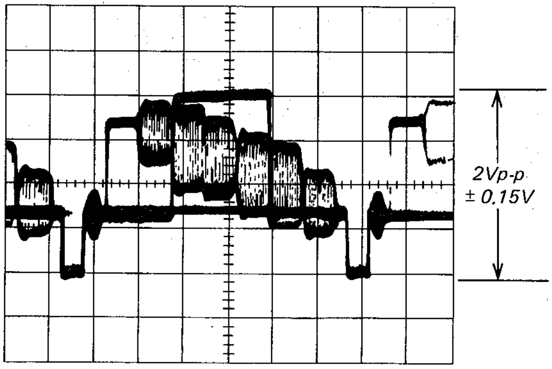



TP203
TP204
TP215
P506
TP513
R555
TP530
R553
IC501
R552
R558
R652
R651
R551
TP204
TP201
TP203
TP206
TP215
R252
P604
R256
R254
R251
R253
TP212
TP213
IC601
P255
R257
R258
R259
TP202
R256
R252
TP202
R251
R258

Main P.C. Board

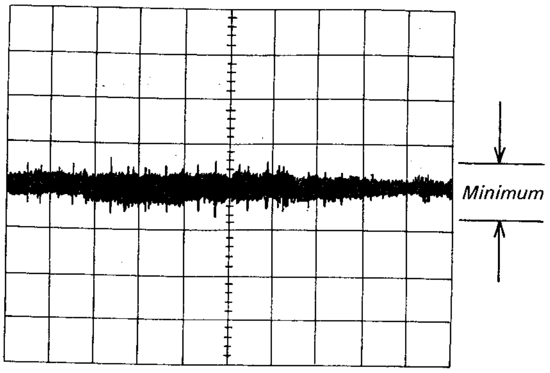
2-4-6. Playback Y signal output level

1. Play back the test tape (PAL color bar signal).
2. Connect the oscilloscope to TP203 and trigger the scope with HD pulse at TP204. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R256 so that amplitude of 2.0Vp-p ± 0.15V is obtained between the sync tip and the 100% white level.



2-4-7. Y comb-filter balance

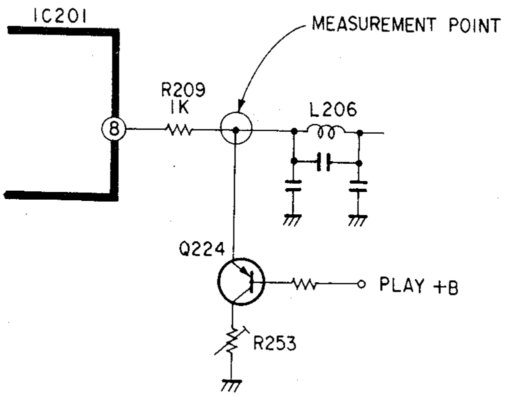
1. Play back the test tape (PAL color bar signal).
2. Connect the oscilloscope (CH-1) to TP212 and the (CH-2) to TP213, and trigger the scope with HD pulse at TP204. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust the scope so that amplitude gain for each channel is the same.
4. Set polarity of the CH-2 to the negative (INV) mode.
5. Set the scope to ADD mode which adds signals in the CH-1 and CH-2. Adjust R257 so that amplitude on the scope display shows minimum. (Ignore glitches.)

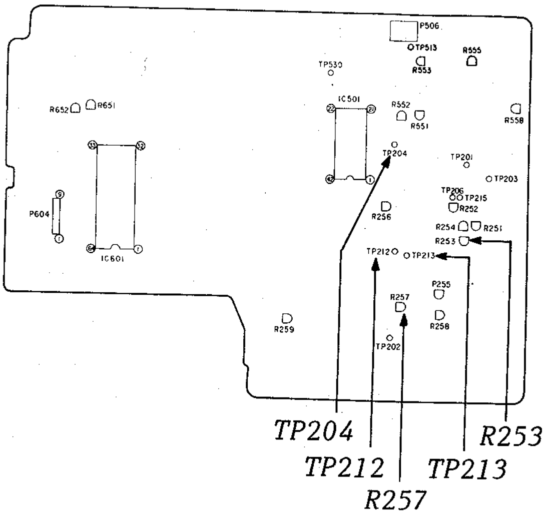


2-4-8. EE DC level

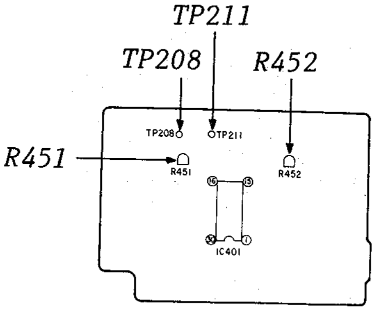
1. Connect a digital voltmeter (DC range) to the measurement point shown in the illustration.
2. Feed no signal to the LINE input. Record no signal and then play back the no signal just recorded while reading the voltmeter. Assure the voltage reading is A [V].
3. Set the VTR to EE mode. Adjust R253 so that the voltmeter shows A [V] + 0.10V ± 0.20V.

Note:
When readjustment is performed on "Playback Y signal output level", always perform this adjustment.





Main P.C. Board



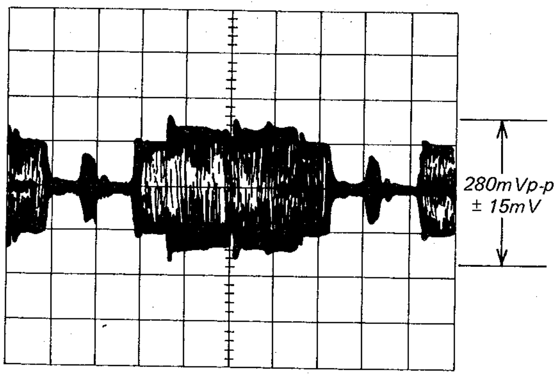
Video 2 P.C. Board

2-4-9. 4.43 MHz crystal oscillator frequency

1. Play back the test tape (PAL color bar signal).
2. Connect a frequency counter to TP211.
3. Adjust R452 until frequency reading of 4.433619 MHz ± 25 Hz is obtained.

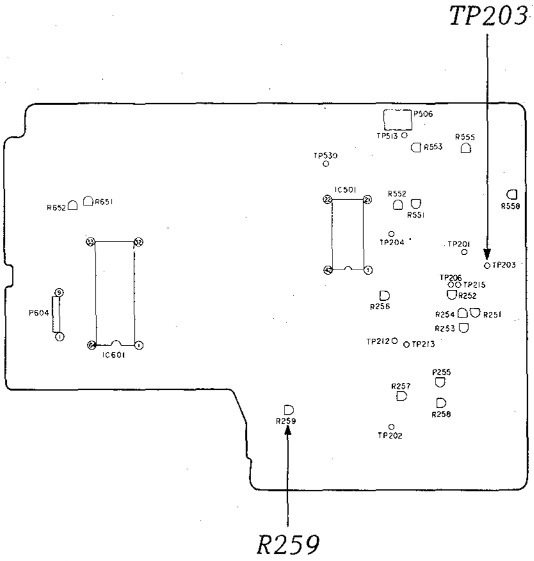
2-4-10. Color record current

1. Feed the PAL color bar signal to the line input terminals and set the VTR to the REC mode.
2. Connect the oscilloscope to TP208 and trigger the scope with HD pulse at TP204. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R451 so that amplitude of the red portion shows 280mVp-p 15mV.

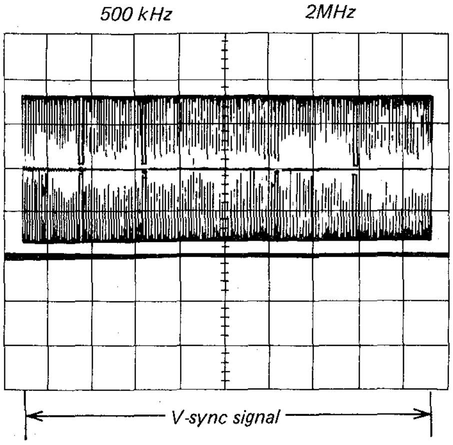


2-4-11. Picture sharpness preset

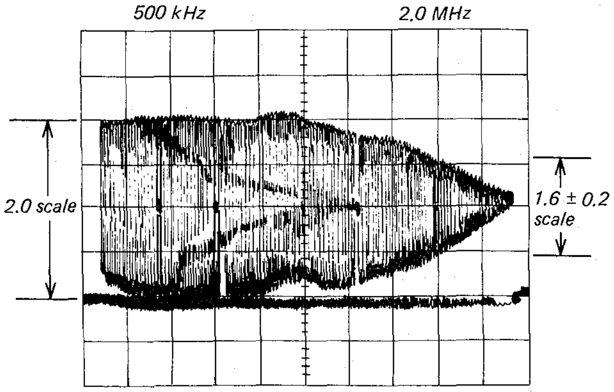
1. Place the sharpness control in its center click position.
2. Record and play back a video sweep signal fed to the line input terminals.
3. Connect the oscilloscope to TP203 and trigger the scope with a signal at TP103. Adjust the scope so that a waveform is displayed for more than 1V (vertical sync) period.
4. Adjust R259 so that relative amplitude at 2 MHz shows 1.6 ± 0.2 (scale), where amplitude at 500 KHz is assumed as "A" (A = 2 scale).
5. Confirm that 2 MHz level increases when the sharpness control is turned clockwise and decreases when turned counterclockwise. Then replace the control at its center click position.


TP203
P506
TP513
R553
R555
TP530
IC501
R552
R551
R558
R652
R651
TP204
TP201
TP203
TP206
TP215
R252
R256
R254
R251
R253
P604
IC601
TP212
TP213
P255
R257
R258
R259
TP202
R259

Main P.C. Board

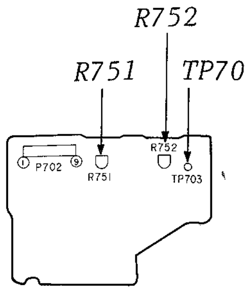


Input sweep signal



Playback waveform of TP203

2-5. Audio Circuit



Audio P.C. Board

Note:

* Adjustments for the playback frequency response and playback output level may not be performed if the audio control head is improperly positioned on the audio track. In such a case, perform the azimuth adjustment and height adjustment perfectly, and then proceed with the adjustments 2-5-1 to 2-5-5.

* When using alignment tapes other than those specified below always make sure that interchangeability is assured for the tapes before proceeding the adjustments.

2-5-1. Playback output level

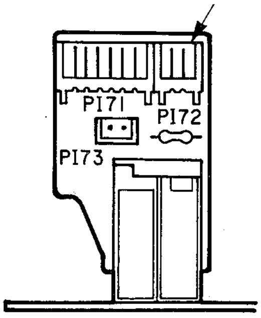
1. Connect 10k ohm to the audio line output terminal and playback the alignment tape (ST-C1).
2. Adjust R751 until output level obtains -5 dBs ±0.5 dBs.

2-5-2. Record/Erase oscillator frequency

1. Connect the frequency counter across TP703 and GND.
2. Set the VTR to record mode and check that the frequency counter shows 68 kHz ± 6.8 kHz.

2-5-3. Bias current

1. Short circuit the audio line input terminal, creating a no input signal condition. Connect a millivoltmeter to pins 1 and 2 (GND) of PI72.
2. Set the VTR to the record mode and adjust R752 to obtain 3.0mVrms.



Connect a millivoltmeter to PI72

ACE Head P.C. Board

2-5-4. Record/playback frequency characteristics

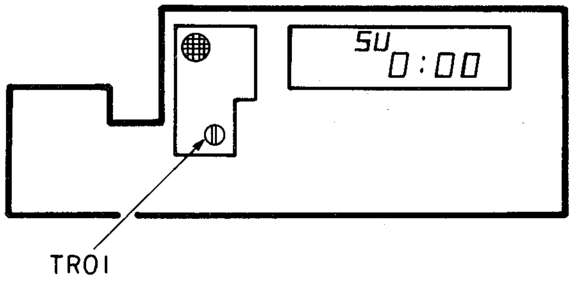
1. Connect a 10k ohm resistor to the audio line output terminal.
2. Apply 400 Hz and 8 kHz signals of -25 dBs to audio line input terminal, and record the signal.
3. Play back the signals just recorded and check that the output of 8 kHz is 0 dB ± 4 dB, referred to the output of 400 Hz.
4. If the 8 kHz output level is higher than that of 400 Hz by more than 4 dB, adjust the bias current to a value higher than 3.0mVrms; and if the 8 kHz output is lower than that by less than -4 dB, adjust the bias current to a value lower than 3.0mVrms.

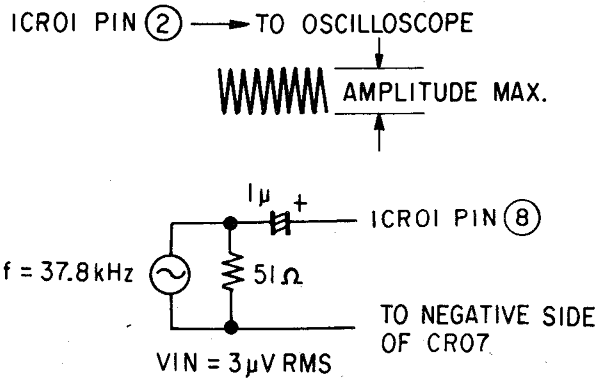
2-5-5. Record/playback output level

1. Connect a 10k ohm resistor to the audio line output.
2. Feed 400 Hz, -5.0 dBs signal to the audio line input terminal and record the signal.
3. Confirm to see the playback output level is -5 dBs ± 3 dB.

2-6. Wireless Remote Control Circuit

1. Connect the oscilloscope across pin 2 of ICR01 and ground. (Use a probe of 10 : 1.)
2. Feed a signal of 37.8 kHz with amplitude of 3μVrms across pin 8 of ICR01 and (-) side of CR07 through the network as shown.
3. Adjust TR01 for the maximum amplitude on the scope display.





SECTION 3
SERVICING DIAGRAMS

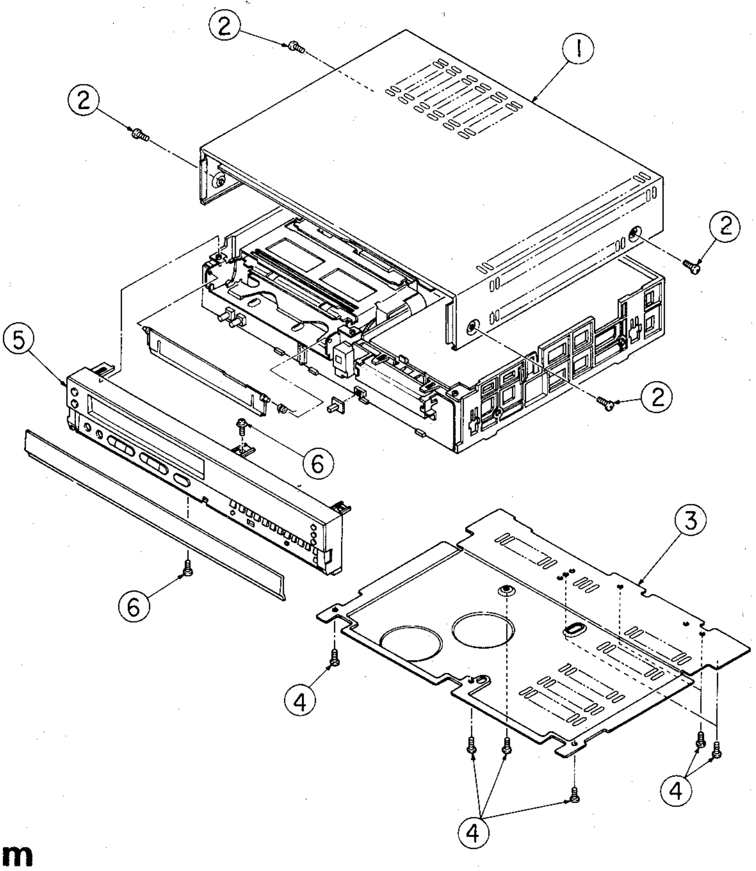
1. Inspection Procedure

Operation steps		Items to be confirmed	Inspection block	Page	
				Block Diagram	Circuit Diagram
1. AC Plug-in	Time setting Program timer setting	Clock display Time setting operation	Power (AC system)	3-9	3-33
			Timer counter		
			(DV-90G)	3-13	3-49
			(DV-90T)	3-13	3-53
			(DV-90W)	3-13	3-53
			VPS (DV-90G)	3-17	3-49
2. Power SW ON	Timer/counter, Channel selection, AFC operation, EE picture & tone quality	Mode display lamp TV receive condition Channel select operation, AFC operation level, EE picture quality, Tone signal level	Power	3-9	3-33
			Logic	3-19	3-57
			PIF, reception		
			(DV-90T)	3-11	3-37
			(DV-90G)	3-11	3-41
			(DV-90W)	3-11	3-45
			Video (EE, Rec mode)	3-26	3-69
			Audio (EE, Rec mode)	3-32	3-79
3. Cassette-in and Cassette-out	Cassette-in Cassette loading Eject Cassette out	F/L mecha. operation Cassette loading operation Eject operation Indicator lamp Abnormal sound	Logic	3-19	3-57
4. Key entry Operation Remote-control	REC, PLAY Cue/Review Still, Frame feeding/slow FF/REW Memory	Indicator lamp Each mode operation (Tape drive operation) Abnormal sound Memory operation	Logic	3-19	3-57
			Remote control block		3-81
5. Special Functions Fully Automatic Play Auto Rewind	Cassette-in at Power OFF REC/PLAY/CUE	Power ON, Cassette down Automatic Play Power OFF after REW Rewind automatically after tape wound	Power	3-9	3-33
			Logic	3-19	3-57
6. Playback Function Picture Quality Tone Quality Others	PLAY (Test tape: ST-C1) Cue/Review Still/Slow	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system	3-26	3-69
			Audio PLAY system	3-30	3-79
			Servo system	3-23	3-61
7. REC/PLAY Functions Picture Quality Tone Quality Others	REC/PLAY	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter, Picture swing, Skew distortion, Flicker, Beat	Video PLAY system	3-26	3-69
			Audio PLAY system	3-30	3-79
			Servo system	3-23	3-61

How to use the table
1. When inspecting a defective VTR, proceed according to the steps shown in the table.
2. Check the items to be confirmed for each operation step.
3. If a problem is found on the item, check waveforms (level) referring to the block diagram relating to the items.
4. Use PC board pattern diagram and schematic diagram to examine the circuit precisely.
5. After completion of the repair work, check steps 1 — 7 again.

2. Removal of Cabinet

1. Disconnect power cord plug from AC outlet.
2. Remove 4 screws ② securing top cover ①.
3. Remove the top cover ① by sliding it backward.
4. Remove 6 screws ④ securing bottom cover ③, then remove the bottom cover.
5. Remove 2 screws ⑥ securing front panel ⑤.
6. Remove the front panel ⑤.


②
①
②
②
⑤
②
⑥
③
⑥
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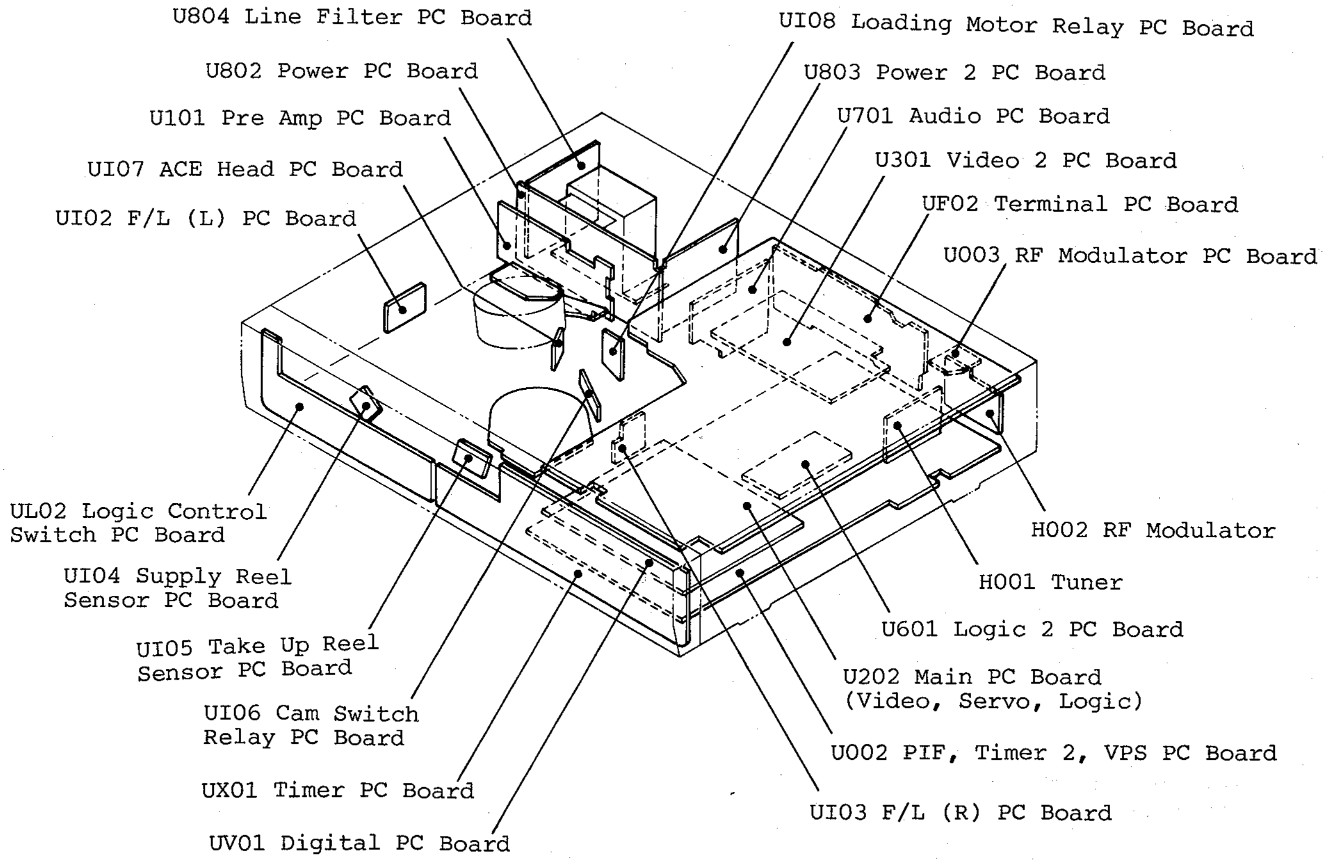
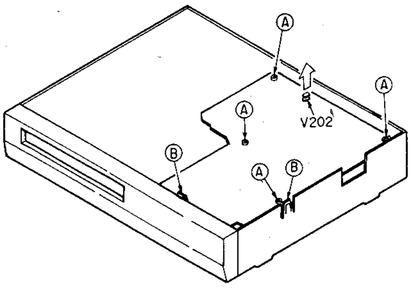
④

3. Electrical Units Location Diagram


U804 Line Filter PC Board
U802 Power PC Board
U101 Pre Amp PC Board
UI07 ACE Head PC Board
UI02 F/L (L) PC Board
UI08 Loading Motor Relay PC Board
U803 Power 2 PC Board
U701 Audio PC Board
U301 Video 2 PC Board
UF02 Terminal PC Board
U003 RF Modulator PC Board
UL02 Logic Control Switch PC Board
UI04 Supply Reel Sensor PC Board
UI05 Take Up Reel Sensor PC Board
UI06 Cam Switch Relay PC Board
UX01 Timer PC Board
UV01 Digital PC Board
H002 RF Modulator
H001 Tuner
U601 Logic 2 PC Board
U202 Main PC Board (Video, Servo, Logic)
U002 PIF, Timer 2, VPS PC Board
UI03 F/L (R) PC Board

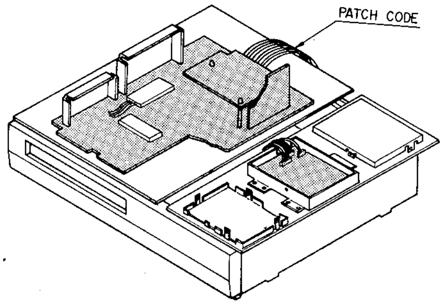
4. Standing PC Board for Servicing



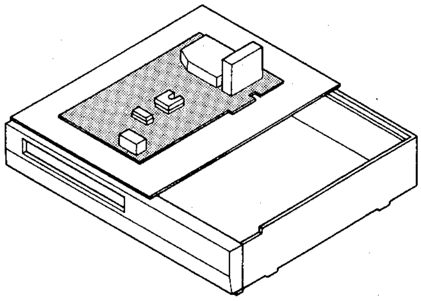
Note:

1. Remove 4 screws Ⓐ .
2. Unhook 2 claws Ⓑ fixing the main PC board.
3. Pull V202 upward and remove the main PC board, terminal PC board and connector (PF02, P206) to separate the PC Board.
4. Connect the connectors PF02 and P206 using a patch cord (SN: 70179076).

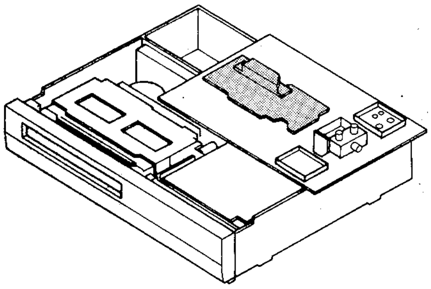
Main (Video, Servo, Logic), Video 2, Audio, Digital PC Board



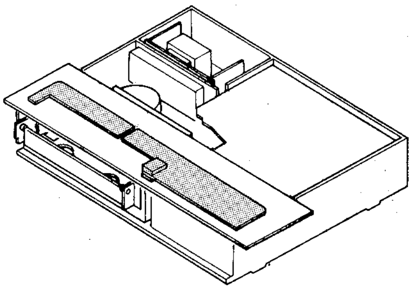
PIF, Timer 2, VPS PC Board

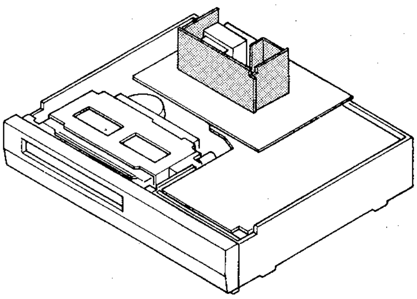


Terminal PC Board

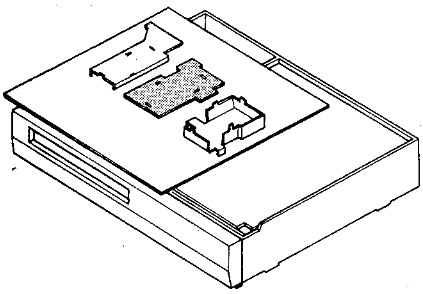


Timer, Logic Control Switch PC Board





Pre Amp PC Board



5. Part Configuration and their Symbols

1. ICs

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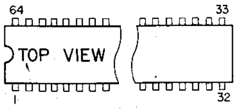
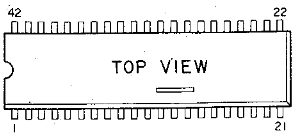
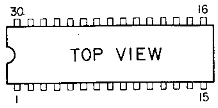
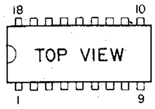
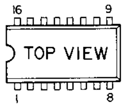
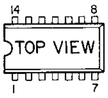
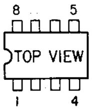
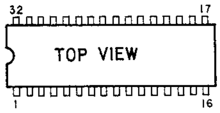
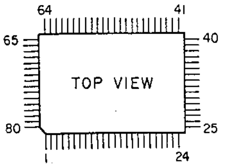
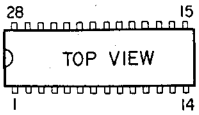
TMP47C460AN9238 TMP47C870N4845Z	 64 33 TOP VIEW 1 32
TD6361N-C5 TMP47C410AN6696	 42 22 TOP VIEW 1 21
M51365SP TA8632N TMP47C231AN4956	 30 16 TOP VIEW 1 15
TMM41464P-12	 18 10 TOP VIEW 1 9
TL8709P,MB40576 TC4053BP TC4538BP TD6350P MB40776	 16 9 TOP VIEW 1 8
AN3313 TA75339P M58659P BA10324	 14 8 TOP VIEW 1 7
TA75358CP	 8 5 TOP VIEW 1 4
BA7258AS	 32 17 TOP VIEW 1 16
T671147	 64 41 65 40 TOP VIEW 80 25 1 24
SAA5235	 28 15 TOP VIEW 1 14

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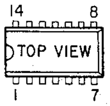
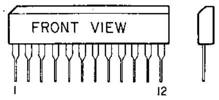
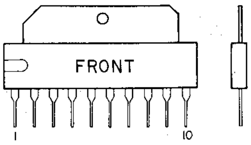
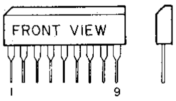
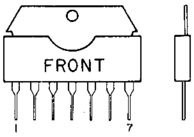
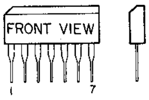
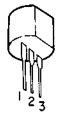
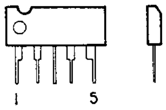
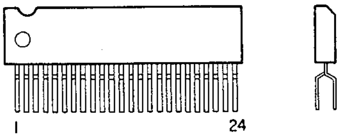
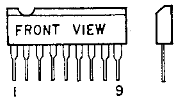
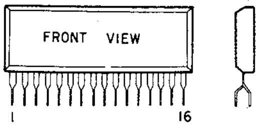
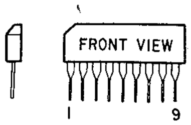
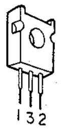
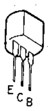
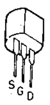
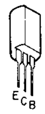
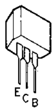
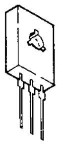
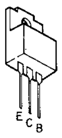
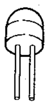
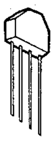
SAF1135P	 14 8 TOP VIEW 1 7
TA8618S	 FRONT VIEW 1 12
TA7288P	
TC5081AP UPC1474HA	 FRONT VIEW 1 9
TA7267P	
TA7374P	 FRONT VIEW 1 7
PST520D PST520C	
BA7755	
BA7751ALS	
BA7021	 FRONT VIEW 1 9

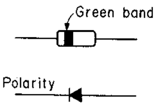
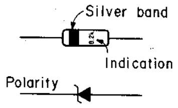
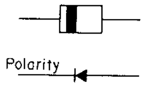
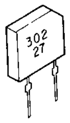
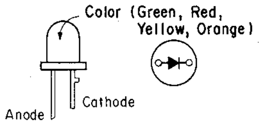
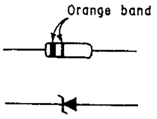
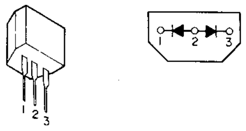
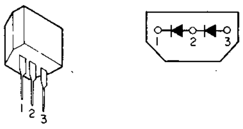
NAME	SHAPE
LA7311	 FRONT VIEW 1 16
LA7910	 FRONT VIEW 1 9
TA78L009AP	

2. TRANSISTORS

NAME	SHAPE
2SC388ATM 2SC1815-Y 2SC2878-A 2SC1959-Y	
2SK117-GRFA2	
2SA966-Y 2SC2236Y	
2SA1048-Y, 2SA1297GR 2SC2458-Y, RN2203, 2SC2668-Y RN1201, RN2201, RN2204 RN1202, RN1203, RN1206 RN1204, RN2202, RN2206	
2SD1379	
2SD1413 2SD1415 2SD1405-BL 2SB1187-E	

NAME	SHAPE
PN202S-S.TH PN202S-R.TH	
THS103A	

3. DIODES

NAME	SHAPE
1SS176 1SS177	 Green band Polarity
05Z7.5Y 05Z13Y 05Z12X 05Z5.6Y	 Silver band Indication Polarity
ERC04-02F 1SS1885	
PH-302	
GL450V TLG133A FA	 Color (Green, Red, Yellow, Orange) Anode Cathode
MA1330-M	 Orange band
1SS200	
1SS227	

PRECAUTIONS FOR PART REPLACEMENT

- * In the schematic diagram, parts marked ⚠ (ex. ⚠ F801) are critical part to meet the safety regulations, so always use the parts bearing specified part codes (SN) when replacing them.
- * Using the parts other than those specified shall violate the regulations, and may cause troubles such as operation failures, fire, etc.

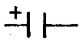
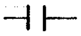
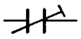
SOLID RESISTOR INDICATION

Resistor	**1/8W film**	**P type film**	**U type film**	**Solid**	**Oxide film**	**Metal film**	**Cement**	**Fuse**
Symbol	None	P	U	S	R	W	W	RF

Tolerance	±2%	±5%	±10%	±20%
Symbol	G	J	None	None

* All film type and oxide film resistors used are ±5%, so the tolerance symbol was not indicated for them.

CAPACITANCE INDICATION

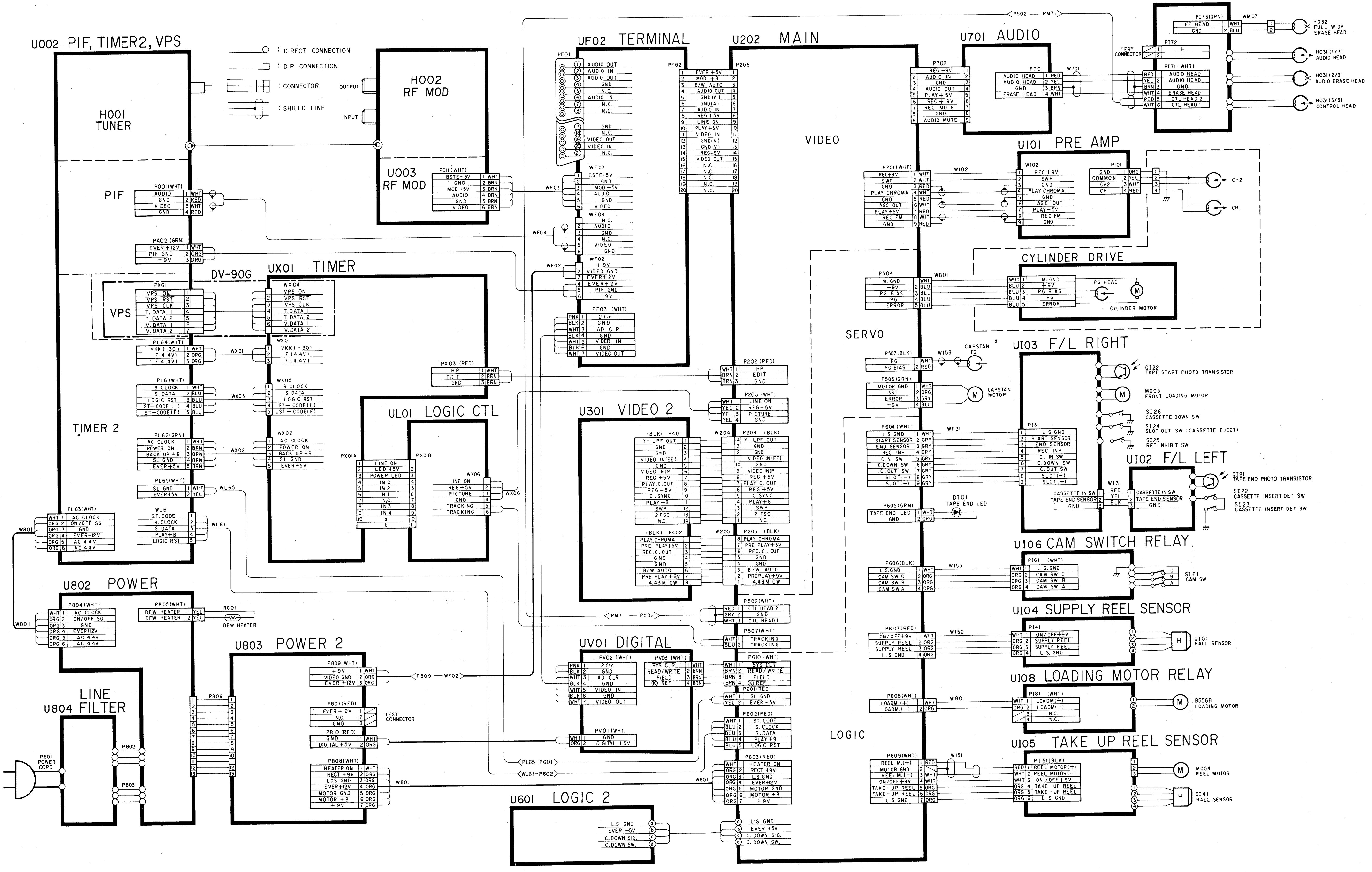
Description	**Symbol**	**Capacitance, unit**	**Capacitance allowance**
Electrolytic		µF	Not indicated
Special electrolytic			Indicated
Plastic film		µF:indicated with numbers below decimal point	Indicated below ±5% (J), indicated below ±0.5pF, not indicated for others
Ceramic		pF:indicated with numbers over decimal point	
Trimmer		pF	Not indicated

Note: No working voltage is indicated for capacitors rated at 50V except electrolytic capacitors.

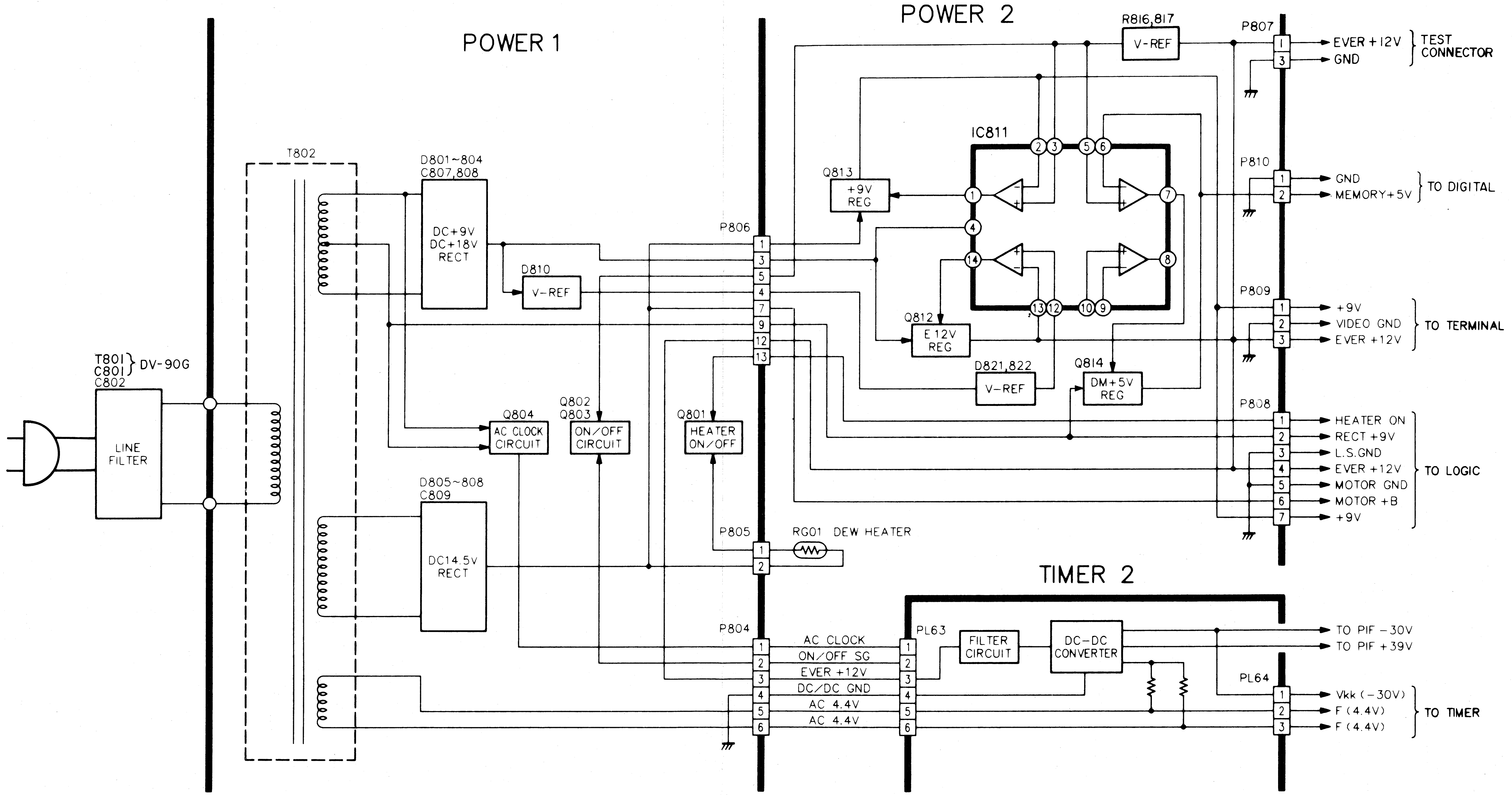
WAVEFORM AND VOLTAGE MEASUREMENT

- * Measurement of waveform and voltage at each section in the color circuits was conducted with sufficient service color bar signal being received and reproduced in normal conditions.
- * Waveforms and voltage values for the remaining circuit were measured with a broadcasting signal normally received, so they may vary slightly according to the programs being received. Use them as a measure for servicing.
- * All voltage values except the waveforms are expressed in DC and measured by a digital voltmeter.

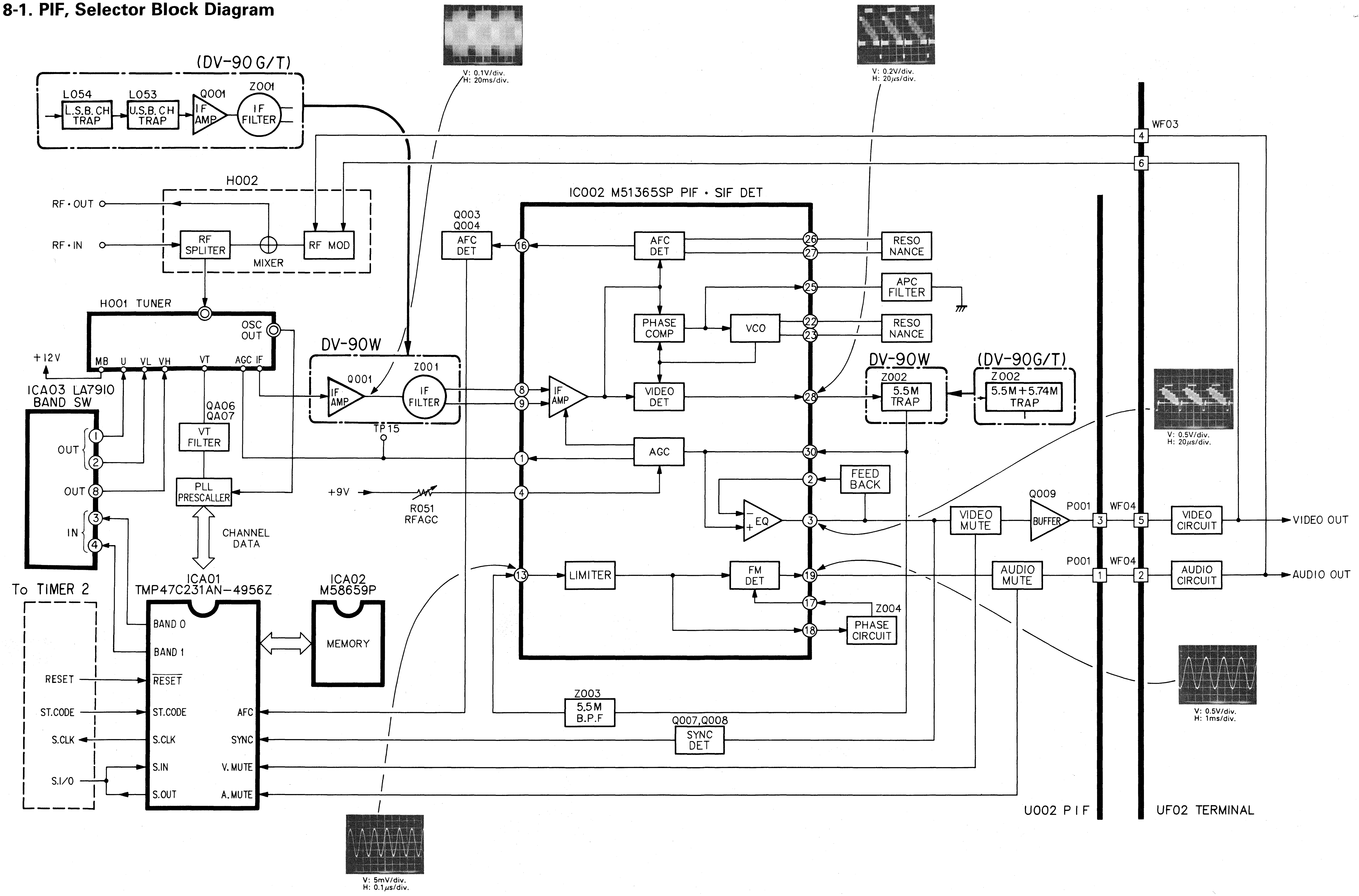
6. Printed Wiring Board and Schematic Diagram


U002 PIF, TIMER2, VPS
H001 TUNER
PIF
TIMER 2
VPS
DV-90G
: DIRECT CONNECTION
: DIP CONNECTION
: CONNECTOR
: SHIELD LINE
OUTPUT
INPUT
H002 RF MOD
U003 RF MOD
P011(WHT)
P001(WHT)
PA02(GRN)
PX61
PL64(WHT)
PL61(WHT)
PL62(GRN)
PL65(WHT)
PL63(WHT)
WL61
UX01 TIMER
WX04
WX01
WX05
WX02
WX06
PX03(RED)
UL01 LOGIC CTL
PX01A
PX01B
UF02 TERMINAL
PF01
PF02
WF03
WF04
WF02
PF03 (WHT)
U202 MAIN
P206
VIDEO
SERVO
LOGIC
U301 VIDEO 2
P401
P402
W204
W205
P204 (BLK)
P205 (BLK)
P202 (RED)
P203 (WHT)
P502(WHT)
P507(WHT)
P610 (WHT)
P601(RED)
P602(RED)
P603(RED)
UV01 DIGITAL
PV02 (WHT)
PV03 (WHT)
PV01(WHT)
U601 LOGIC 2
U802 POWER
P804 (WHT)
P805(WHT)
RG01
DEW HEATER
U803 POWER 2
P809 (WHT)
P807(RED)
P810 (RED)
P808(WHT)
TEST CONNECTOR
U804 LINE FILTER
P801 POWER CORD
P802
P803
P806
W801
WL65
<PM71 — P502>
<P809 — WF02>
<PL65-P601>
<WL61-P602>
<P502 — PM71>
U701 AUDIO
P702
P701
W701
U107 ACE HEAD RELAY
P173(GRN)
P172
P171(WHT)
WM07
TEST CONNECTOR
H032 FULL WIDTH ERASE HEAD
H031(1/3) AUDIO HEAD
H031(2/3) AUDIO ERASE HEAD
H031(3/3) CONTROL HEAD
U101 PRE AMP
P201(WHT)
W102
P101
CH2
CH1
CYLINDER DRIVE
P504
W801
PG HEAD
CYLINDER MOTOR
P503(BLK)
W153
CAPSTAN FG
P505(GRN)
CAPSTAN MOTOR
U103 F/L RIGHT
P604(WHT)
WF31
P131
Q122 TAPE START PHOTO TRANSISTOR
M005 FRONT LOADING MOTOR
S126 CASSETTE DOWN SW
S124 SLOT OUT SW (CASSETTE EJECT)
S125 REC INHIBIT SW
U102 F/L LEFT
W131
Q121 TAPE END PHOTO TRANSISTOR
S122 CASSETTE INSERT DET SW
S123 CASSETTE INSERT DET SW
P605(GRN)
D101 TAPE END LED
U106 CAM SWITCH RELAY
P606(BLK)
P161 (WHT)
S161 CAM SW
U104 SUPPLY REEL SENSOR
P607(RED)
W152
P141
Q151 HALL SENSOR
U108 LOADING MOTOR RELAY
P608(WHT)
P181 (WHT)
B556B LOADING MOTOR
U105 TAKE UP REEL SENSOR
P609(WHT)
W151
P151(BLK)
M004 REEL MOTOR
Q141 HALL SENSOR

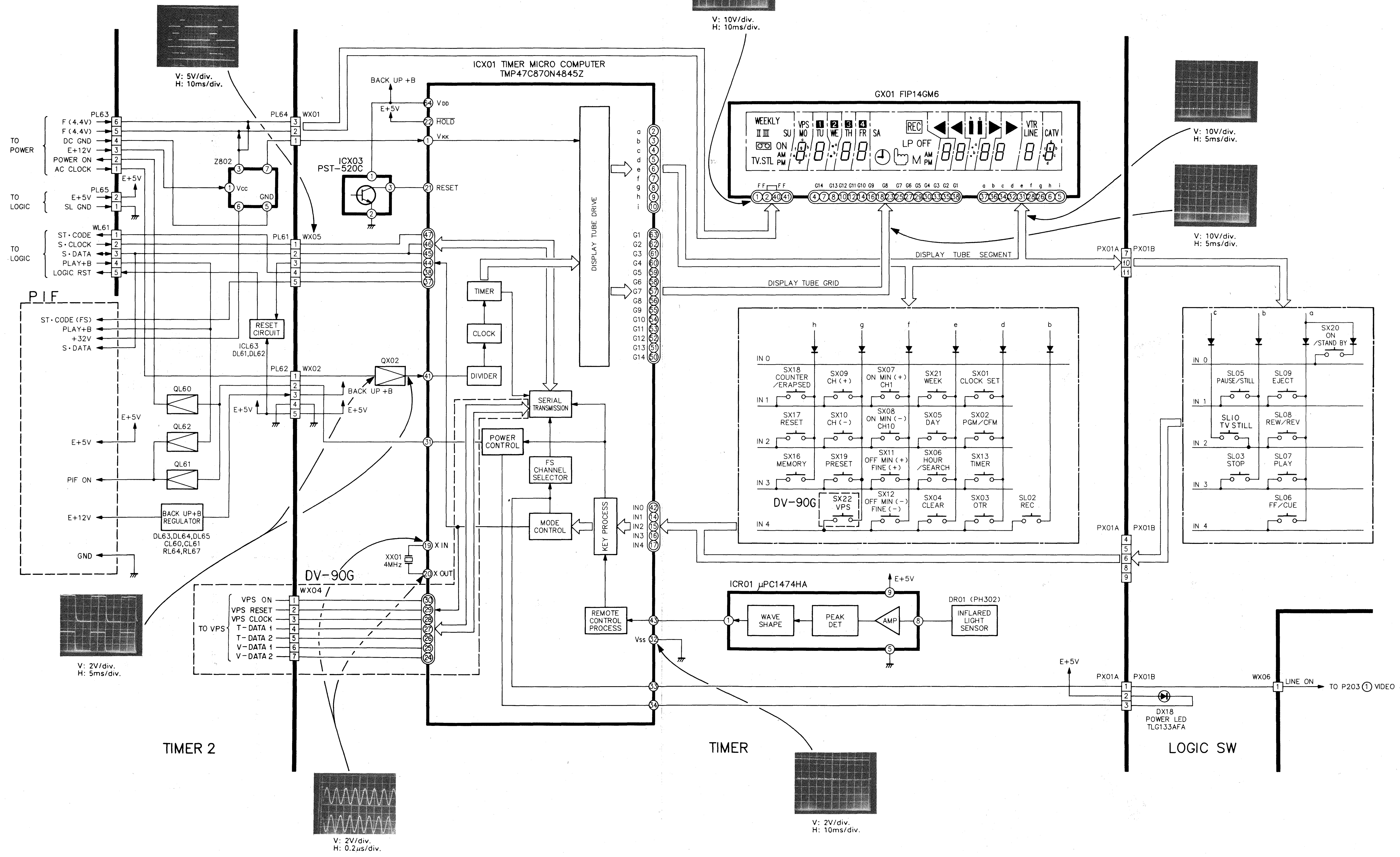
7-1. Power Supply Block Diagram

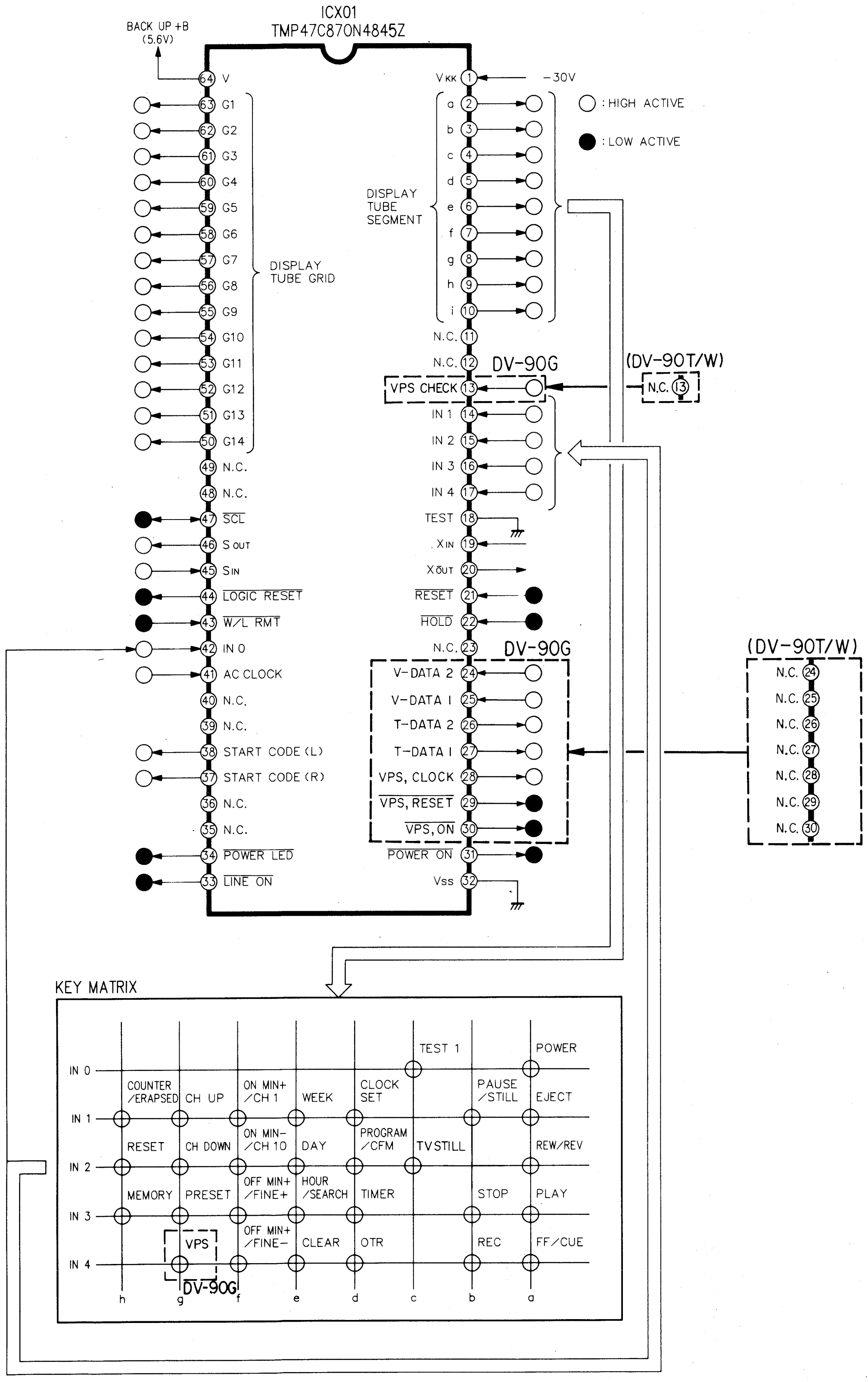

POWER 1
POWER 2
TIMER 2
T801
C801
C802
DV-90G
LINE FILTER
T802
D801~804
C807,808
DC+9V
DC+18V
RECT
D810
V-REF
D805~808
C809
DC14.5V
RECT
Q804
AC CLOCK CIRCUIT
Q802
Q803
ON/OFF CIRCUIT
Q801
HEATER ON/OFF
P806
P805
RG01 DEW HEATER
P804
AC CLOCK
ON/OFF SG
EVER +12V
DC/DC GND
AC 4.4V
AC 4.4V
PL63
FILTER CIRCUIT
DC-DC CONVERTER
PL64
Q813
+9V REG
IC811
Q812
E 12V REG
D821,822
V-REF
Q814
DM+5V REG
R816,817
V-REF
P807
EVER +12V
GND
TEST CONNECTOR
P810
GND
MEMORY+5V
TO DIGITAL
P809
+9V
VIDEO GND
EVER +12V
TO TERMINAL
P808
HEATER ON
RECT +9V
L.S.GND
EVER +12V
MOTOR GND
MOTOR +B
+9V
TO LOGIC
TO PIF -30V
TO PIF +39V
Vkk (-30V)
F (4.4V)
F (4.4V)
TO TIMER

8-1. PIF, Selector Block Diagram

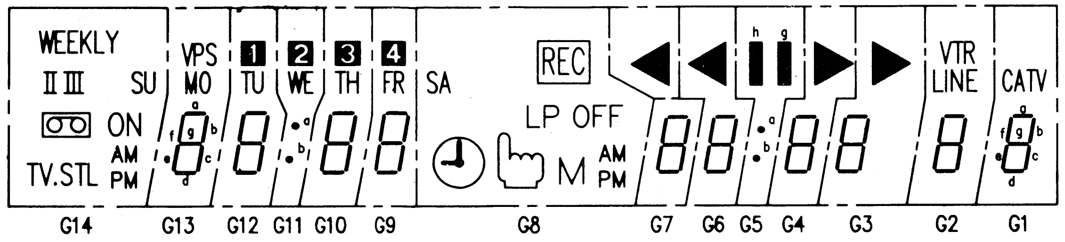

(DV-90 G/T)
L054
L.S.B. CH TRAP
L053
U.S.B. CH TRAP
Q001
IF AMP
Z001
IF FILTER
V: 0.1V/div.
H: 20ms/div.
V: 0.2V/div.
H: 20μs/div.
WF03
4
6
H002
RF・OUT
RF・IN
RF SPLITER
MIXER
RF MOD
IC002 M51365SP PIF・SIF DET
Q003
Q004
AFC DET
16
AFC DET
26
27
RESO NANCE
25
APC FILTER
PHASE COMP
VCO
22
23
RESO NANCE
H001 TUNER
OSC OUT
DV-90W
+12V
MB
U
VL
VH
VT
AGC
IF
Q001
IF AMP
Z001
IF FILTER
8
9
IF AMP
VIDEO DET
28
DV-90W
Z002
5.5M TRAP
(DV-90G/T)
Z002
5.5M+5.74M TRAP
V: 0.5V/div.
H: 20μs/div.
ICA03 LA7910
BAND SW
OUT
1
2
OUT
8
IN
3
4
QA06
QA07
VT FILTER
TP15
1
AGC
30
PLL PRESCALLER
+9V
R051
RFAGC
4
FEED BACK
2
EQ
3
Q009
BUFFER
P001
3
WF04
5
VIDEO MUTE
VIDEO CIRCUIT
VIDEO OUT
CHANNEL DATA
To TIMER 2
ICA01
TMP47C231AN-4956Z
ICA02
M58659P
13
LIMITER
FM DET
19
P001
1
WF04
2
AUDIO MUTE
AUDIO CIRCUIT
AUDIO OUT
17
Z004
18
PHASE CIRCUIT
BAND 0
BAND 1
MEMORY
RESET
RESET
ST.CODE
ST.CODE
AFC
S.CLK
S.CLK
SYNC
S.IN
V. MUTE
S.I/O
S.OUT
A. MUTE
Z003
5.5M B.P.F
Q007,Q008
SYNC DET
V: 0.5V/div.
H: 1ms/div.
U002 PIF
UF02 TERMINAL
V: 5mV/div.
H: 0.1μs/div.

9-1. Timer, Display Block Diagram


V: 5V/div.
H: 10ms/div.
V: 10V/div.
H: 10ms/div.
V: 10V/div.
H: 5ms/div.
V: 10V/div.
H: 5ms/div.
V: 2V/div.
H: 5ms/div.
V: 2V/div.
H: 0.2μs/div.
V: 2V/div.
H: 10ms/div.
ICX01 TIMER MICRO COMPUTER
TMP47C870N4845Z
BACK UP +B
E+5V
VDD
HOLD
VKK
RESET
ICX03
PST-520C
Z802
Vcc
GND
PL63
F (4.4V)
F (4.4V)
DC GND
E+12V
POWER ON
AC CLOCK
TO POWER
PL65
E+5V
SL GND
TO LOGIC
WL61
ST·CODE
S·CLOCK
S·DATA
PLAY+B
LOGIC RST
TO LOGIC
PL64
WX01
PL61
WX05
PIF
ST·CODE (FS)
PLAY+B
+32V
S·DATA
E+5V
PIF ON
E+12V
GND
RESET CIRCUIT
ICL63
DL61,DL62
PL62
WX02
QX02
BACK UP +B
E+5V
QL60
QL62
QL61
BACK UP+B REGULATOR
DL63,DL64,DL65
CL60,CL61
RL64,RL67
DV-90G
WX04
TO VPS
VPS ON
VPS RESET
VPS CLOCK
T-DATA 1
T-DATA 2
V-DATA 1
V-DATA 2
XX01
4MHz
X IN
X OUT
TIMER
CLOCK
DIVIDER
SERIAL TRANSMISSION
POWER CONTROL
FS CHANNEL SELECTOR
MODE CONTROL
KEY PROCESS
REMOTE CONTROL PROCESS
DISPLAY TUBE DRIVE
a b c d e f g h i
G1 G2 G3 G4 G5 G6 G7 G8 G9 G10 G11 G12 G13 G14
IN0 IN1 IN2 IN3 IN4
Vss
GX01 FIP14GM6
WEEKLY
VPS
SU MO TU WE TH FR SA
REC
VTR LINE
CATV
ON AM PM
TV.STL
LP OFF
M
DISPLAY TUBE SEGMENT
DISPLAY TUBE GRID
PX01A
PX01B
SX18 COUNTER /ERAPSED
SX09 CH (+)
SX07 ON MIN (+) CH1
SX21 WEEK
SX01 CLOCK SET
SX17 RESET
SX10 CH (-)
SX08 ON MIN (-) CH10
SX05 DAY
SX02 PGM/CFM
SX16 MEMORY
SX19 PRESET
SX11 OFF MIN (+) FINE (+)
SX06 HOUR /SEARCH
SX13 TIMER
SX22 VPS
SX12 OFF MIN (-) FINE (-)
SX04 CLEAR
SX03 OTR
SL02 REC
SX20 ON /STAND BY
SL05 PAUSE/STILL
SL09 EJECT
SL10 TV STILL
SL08 REW/REV
SL03 STOP
SL07 PLAY
SL06 FF/CUE
ICR01 μPC1474HA
WAVE SHAPE
PEAK DET
AMP
DR01 (PH302)
INFLARED LIGHT SENSOR
E+5V
WX06
LINE ON
TO P203 ① VIDEO
DX18
POWER LED
TLG133AFA
TIMER 2
TIMER
LOGIC SW

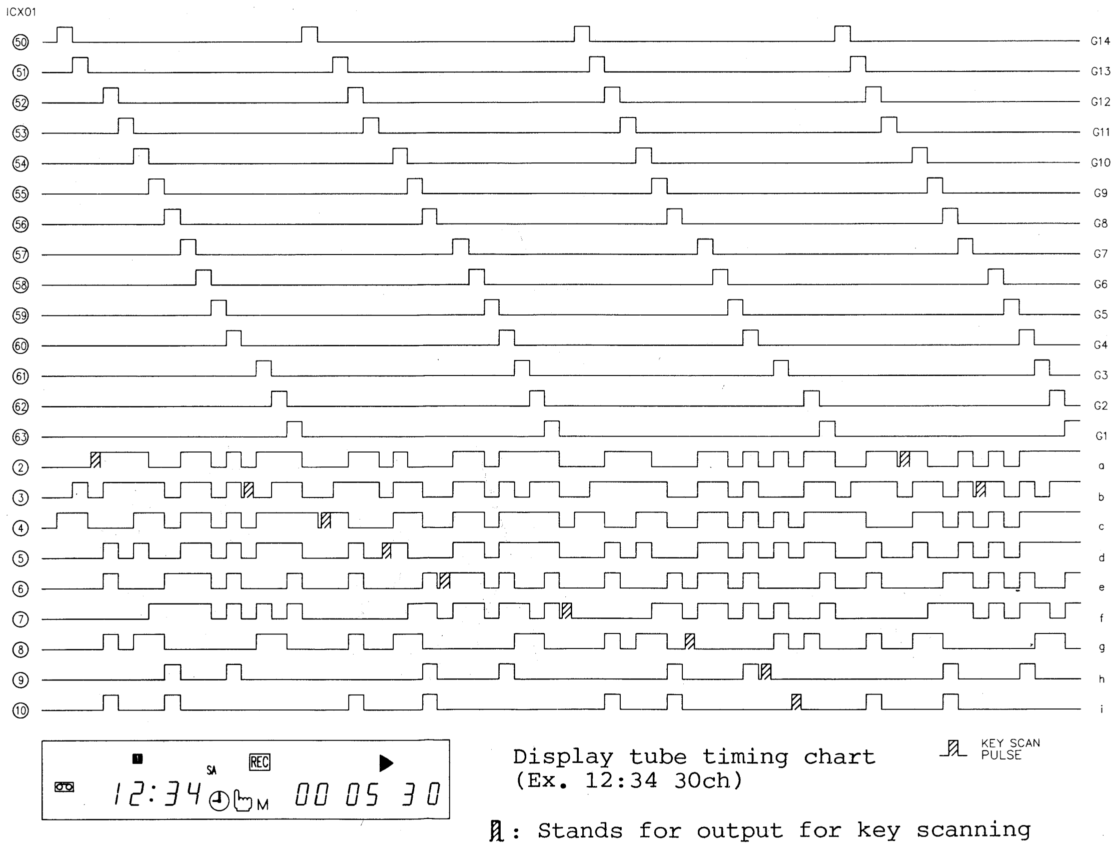

ICX01
TMP47C870N4845Z
BACK UP +B (5.6V)
V
G1
G2
G3
G4
G5
G6
G7
G8
G9
G10
G11
G12
G13
G14
DISPLAY TUBE GRID
N.C.
SCL
S OUT
S IN
LOGIC RESET
W/L RMT
IN 0
AC CLOCK
START CODE (L)
START CODE (R)
POWER LED
LINE ON
VKK
-30V
DISPLAY TUBE SEGMENT
○ : HIGH ACTIVE
● : LOW ACTIVE
DV-90G
(DV-90T/W)
VPS CHECK
IN 1
IN 2
IN 3
IN 4
TEST
XIN
XOUT
RESET
HOLD
V-DATA 2
V-DATA 1
T-DATA 2
T-DATA 1
VPS, CLOCK
VPS, RESET
VPS, ON
POWER ON
Vss
KEY MATRIX
TEST 1
POWER
COUNTER /ERAPSED
CH UP
ON MIN+ /CH 1
WEEK
CLOCK SET
PAUSE /STILL
EJECT
RESET
CH DOWN
ON MIN- /CH 10
DAY
PROGRAM /CFM
TV STILL
REW/REV
MEMORY
PRESET
OFF MIN+ /FINE+
HOUR /SEARCH
TIMER
STOP
PLAY
VPS
OFF MIN+ /FINE-
CLEAR
OTR
REC
FF/CUE

GX01 FIP14GM6


WEEKLY
VPS
SU MO TU WE TH FR SA
ON
AM PM
TV.STL
REC
LP OFF
M
VTR
LINE
CATV
G14 G13 G12 G11 G10 G9 G8 G7 G6 G5 G4 G3 G2 G1

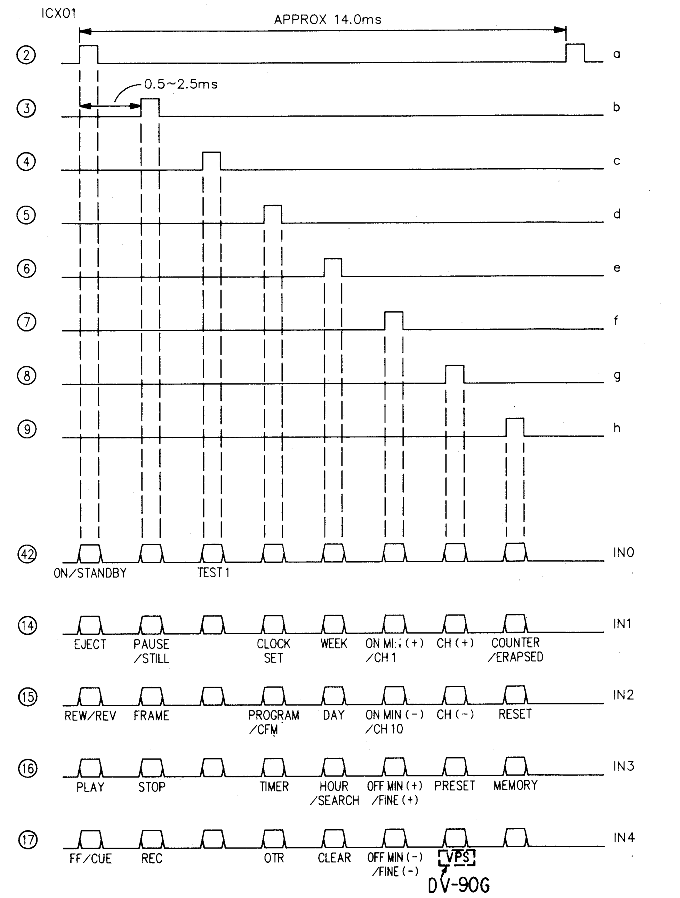
Display Pattern

SEGMENT \ GRID	14G	13G	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	PM	a	a	● (UP)	a	a	PM	a	a	● (UP)	a	a	a	a
b	TV.STL	b	b	● (DOWN)	b	b	M	b	b	● (DOWN)	b	b	b	b
c	⊙⊙	c	c	/	c	c	LP	c	c	/	c	c	c	c
d	AM	d	d	/	d	d	AM	d	d	/	d	d	d	d
e	II	e	e	/	e	e	☞	e	e	/	e	e	e	e
f	III	f	f	/	f	f	◷	f	f	/	f	f	f	f
g	ON	g	g	/	g	g	OFF	g	g	▮(R)	g	g	g	g
h	SU	MO	TU	WE	TH	FR	SA	◀	◀	▮(L)	▶	▶	LINE	CATV
i	WEEKLY	VPS	❶	❷	❸	❹	REC	/	/	/	/	/	VTR	/

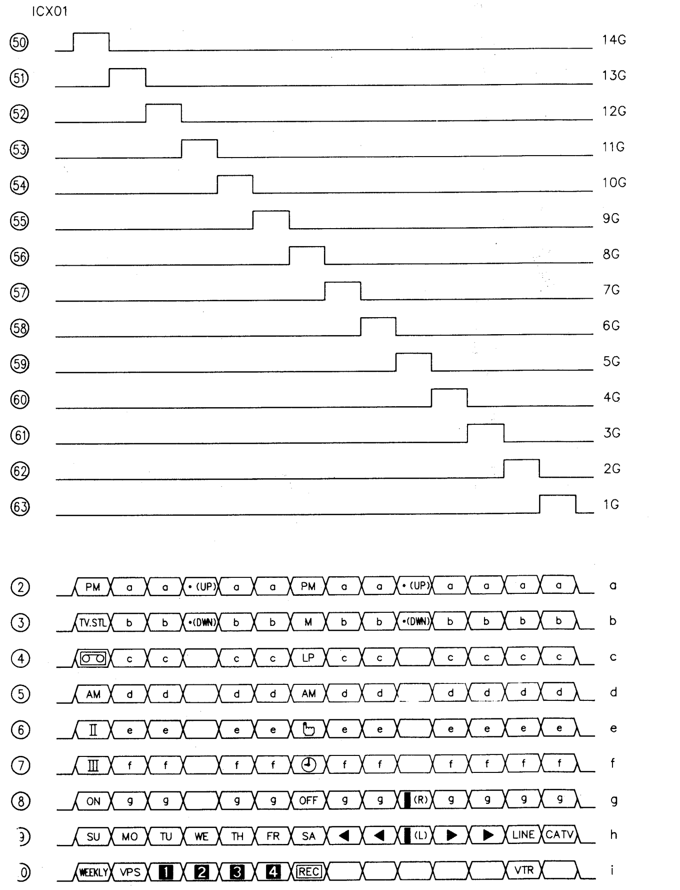


Display tube timing chart
(Ex. 12:34 30ch)

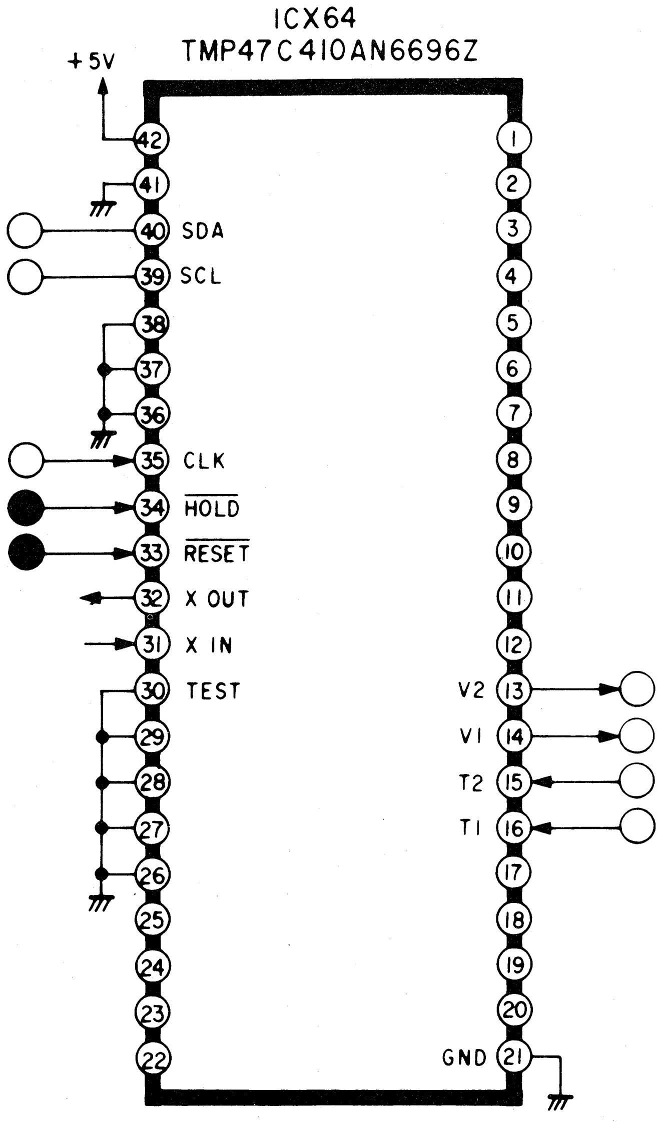
▨ : Stands for output for key scanning and is developed at every two grid outputs.



* The time chart shows outputs for the key scanning only and outputs for the display tube only are omitted.



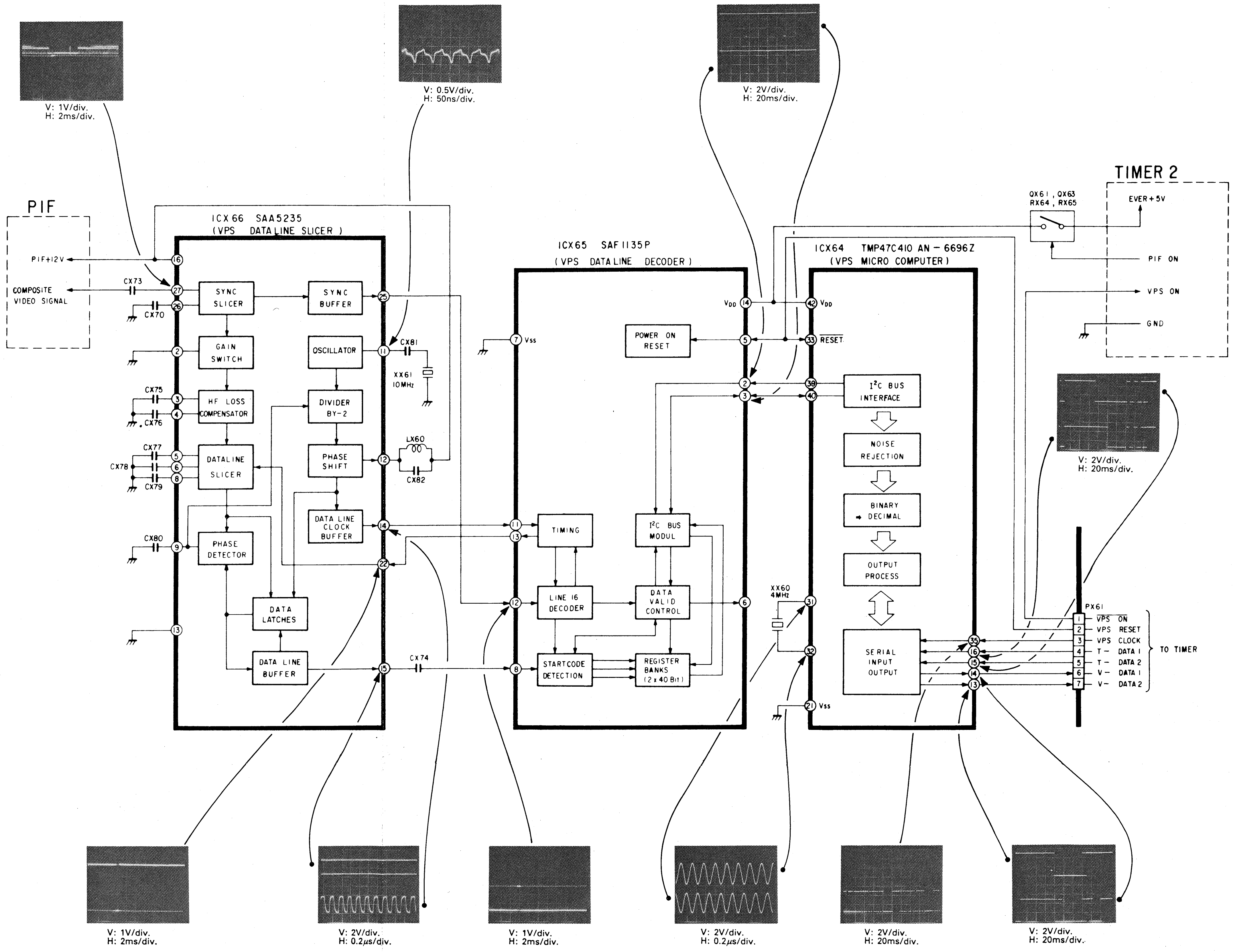
* The time chart shows outputs for the display tube only and outputs for the key scanning are omitted.


ICX64
TMP47C410AN6696Z
+5V
42
41
40 SDA
39 SCL
38
37
36
35 CLK
34 HOLD
33 RESET
32 X OUT
31 X IN
30 TEST
29
28
27
26
25
24
23
22
1
2
3
4
5
6
7
8
9
10
11
12
V2 13
V1 14
T2 15
T1 16
17
18
19
20
GND 21

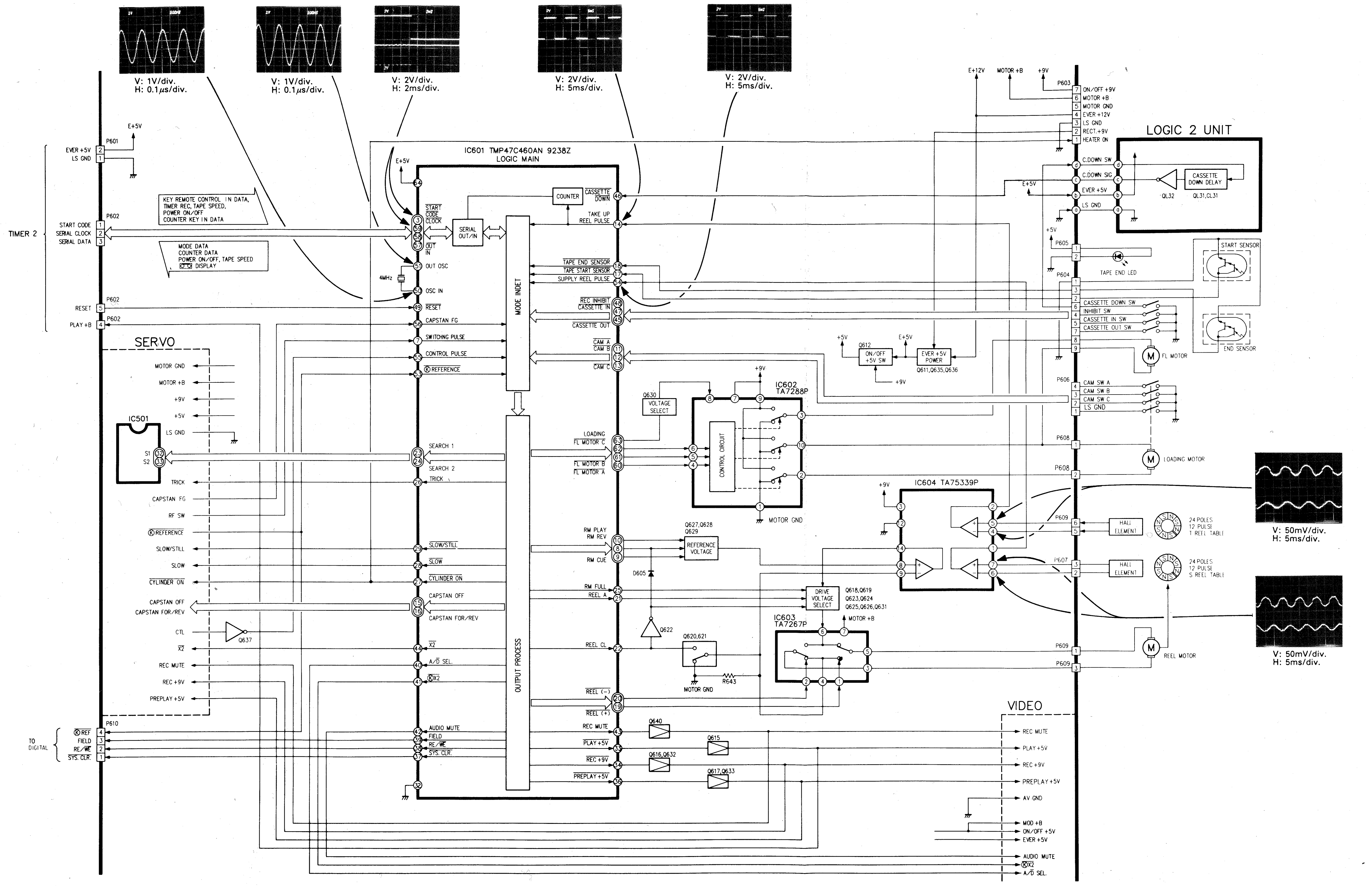
○ : HIGH ACTIVE

● : LOW ACTIVE

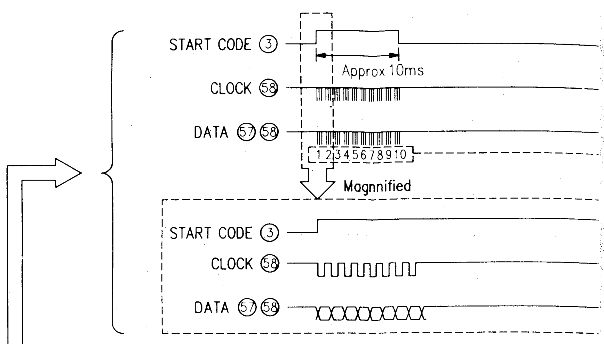
9-2. VPS Block Diagram


V: 1V/div.
H: 2ms/div.
V: 0.5V/div.
H: 50ns/div.
V: 2V/div.
H: 20ms/div.
PIF
PIF+12V
COMPOSITE VIDEO SIGNAL
ICX66 SAA5235
(VPS DATA LINE SLICER)
CX73
CX70
CX75
CX76
CX77
CX78
CX79
CX80
SYNC SLICER
SYNC BUFFER
GAIN SWITCH
OSCILLATOR
HF LOSS COMPENSATOR
DIVIDER BY-2
DATALINE SLICER
PHASE SHIFT
DATA LINE CLOCK BUFFER
PHASE DETECTOR
DATA LATCHES
DATA LINE BUFFER
CX81
XX61
10MHz
LX60
CX82
CX74
ICX65 SAF1135P
(VPS DATA LINE DECODER)
Vss
VDD
POWER ON RESET
TIMING
I²C BUS MODUL
LINE 16 DECODER
DATA VALID CONTROL
STARTCODE DETECTION
REGISTER BANKS (2×40 Bit)
XX60
4MHz
ICX64 TMP47C410 AN-6696Z
(VPS MICRO COMPUTER)
VDD
RESET
I²C BUS INTERFACE
NOISE REJECTION
BINARY → DECIMAL
OUTPUT PROCESS
SERIAL INPUT OUTPUT
Vss
TIMER 2
QX61, QX63
RX64, RX65
EVER+5V
PIF ON
VPS ON
GND
V: 2V/div.
H: 20ms/div.
PX61
1 VPS ON
2 VPS RESET
3 VPS CLOCK
4 T- DATA 1
5 T- DATA 2
6 V- DATA 1
7 V- DATA 2
TO TIMER
V: 1V/div.
H: 2ms/div.
V: 2V/div.
H: 0.2µs/div.
V: 1V/div.
H: 2ms/div.
V: 2V/div.
H: 0.2µs/div.
V: 2V/div.
H: 20ms/div.
V: 2V/div.
H: 20ms/div.

10-1. Logic Block Diagram

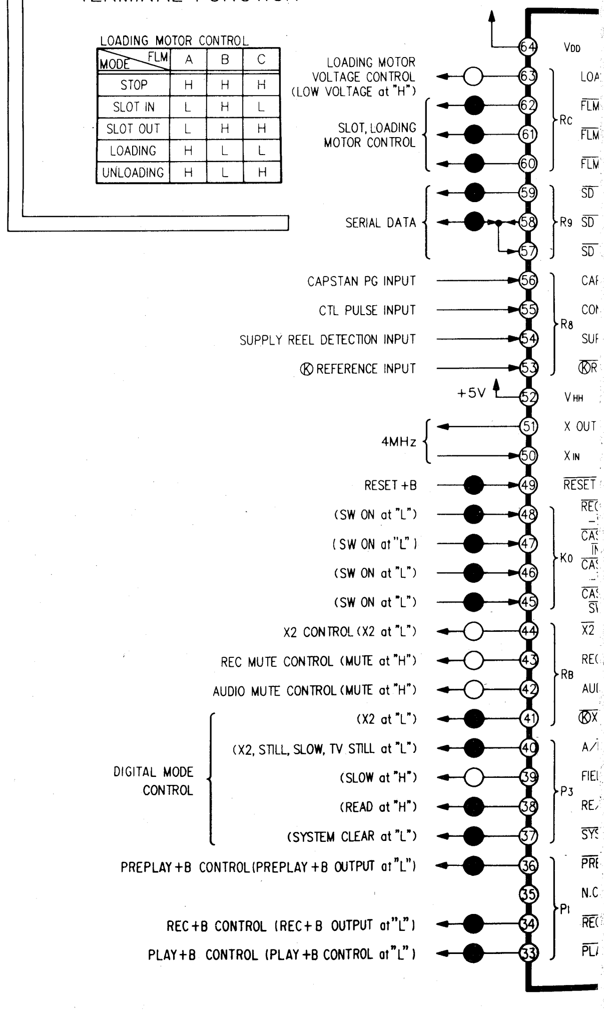

V: 1V/div.
H: 0.1μs/div.
V: 1V/div.
H: 0.1μs/div.
V: 2V/div.
H: 2ms/div.
V: 2V/div.
H: 5ms/div.
V: 2V/div.
H: 5ms/div.
TIMER 2
EVER +5V
LS GND
P601
E+5V
START CODE
SERIAL CLOCK
SERIAL DATA
P602
KEY REMOTE CONTROL IN DATA, TIMER REC, TAPE SPEED, POWER ON/OFF COUNTER KEY IN DATA
MODE DATA COUNTER DATA POWER ON/OFF, TAPE SPEED DISPLAY
RESET
PLAY +B
SERVO
MOTOR GND
MOTOR +B
+9V
+5V
LS GND
IC501
S1
S2
TRICK
CAPSTAN FG
RF SW
Ⓚ REFERENCE
SLOW/STILL
SLOW
CYLINDER ON
CAPSTAN OFF
CAPSTAN FOR/REV
CTL
X2
Q637
REC MUTE
REC +9V
PREPLAY +5V
P610
TO DIGITAL
ⓀREF
FIELD
RE/WE
SYS. CLR.
IC601 TMP47C460AN 9238Z
LOGIC MAIN
COUNTER
CASSETTE DOWN
TAKE UP REEL PULSE
START CODE
CLOCK
SERIAL OUT/IN
OUT
IN
OUT OSC
4MHz
OSC IN
RESET
CAPSTAN FG
SWITCHING PULSE
CONTROL PULSE
Ⓚ REFERENCE
MODE INDET
TAPE END SENSOR
TAPE START SENSOR
SUPPLY REEL PULSE
REC INHIBIT
CASSETTE IN
CASSETTE OUT
CAM A
CAM B
CAM C
SEARCH 1
SEARCH 2
TRICK
LOADING
FL MOTOR C
FL MOTOR B
FL MOTOR A
SLOW/STILL
SLOW
CYLINDER ON
CAPSTAN OFF
CAPSTAN FOR/REV
X2
A/D SEL.
ⓀX2
OUTPUT PROCESS
RM PLAY
RM REV
RM CUE
RM FULL
REEL A
REEL CL
REEL (−)
REEL (+)
AUDIO MUTE
FIELD
RE/WE
SYS. CLR.
REC MUTE
PLAY +5V
REC +9V
PREPLAY +5V
Q630 VOLTAGE SELECT
+9V
IC602 TA7288P
CONTROL CIRCUIT
MOTOR GND
Q627,Q628 Q629
REFERENCE VOLTAGE
D605
Q622
Q620,621
MOTOR GND
R643
Q640
Q615
Q616,Q632
Q617,Q633
DRIVE VOLTAGE SELECT
Q618,Q619 Q623,Q624 Q625,Q626,Q631
IC603 TA7267P
MOTOR +B
IC604 TA75339P
+9V
E+12V
MOTOR +B
+9V
P603
ON/OFF +9V
MOTOR +B
MOTOR GND
EVER +12V
LS GND
RECT.+9V
HEATER ON
LOGIC 2 UNIT
C.DOWN SW
C.DOWN SIG
EVER +5V
LS GND
E+5V
CASSETTE DOWN DELAY
QL32
QL31,CL31
+5V
P605
TAPE END LED
P604
START SENSOR
CASSETTE DOWN SW
INHIBIT SW
CASSETTE IN SW
CASSETTE OUT SW
END SENSOR
FL MOTOR
Q612 ON/OFF +5V SW
E+5V
EVER +5V POWER
Q611,Q635,Q636
+9V
P606
CAM SW A
CAM SW B
CAM SW C
LS GND
P608
LOADING MOTOR
P609
HALL ELEMENT
24 POLES 12 PULSE T REEL TABLE
P607
HALL ELEMENT
24 POLES 12 PULSE S REEL TABLE
REEL MOTOR
V: 50mV/div.
H: 5ms/div.
V: 50mV/div.
H: 5ms/div.
VIDEO
REC MUTE
PLAY +5V
REC +9V
PREPLAY +5V
AV GND
MOD +B
ON/OFF +5V
EVER +5V
AUDIO MUTE
ⓀX2
A/D SEL.

Serial Transmissio


START CODE ③
CLOCK 58
DATA 57 58
Approx 10ms
1 2 3 4 5 6 7 8 9 10
Magnified
START CODE ③
CLOCK 58
DATA 57 58

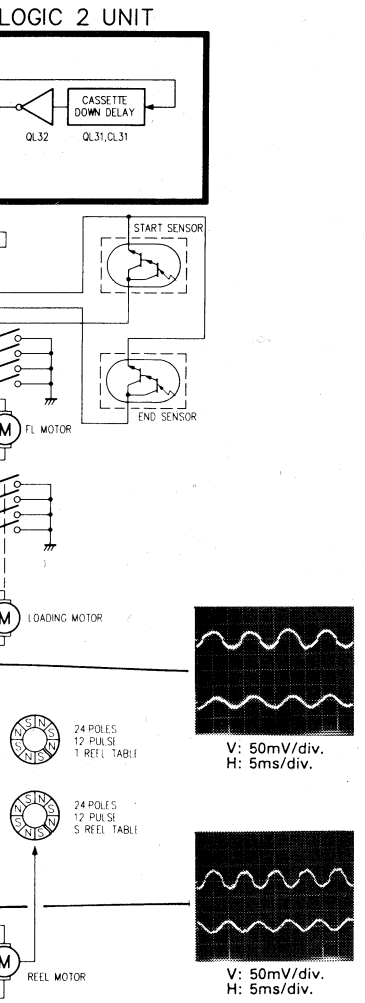
MICROCOMPUTER
TERMINAL FUNCTION

IC601 L
TM

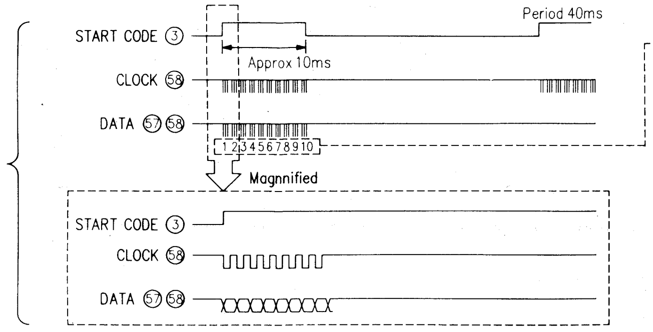

LOADING MOTOR VOLTAGE CONTROL (LOW VOLTAGE at "H")
SLOT, LOADING MOTOR CONTROL
SERIAL DATA
CAPSTAN PG INPUT
CTL PULSE INPUT
SUPPLY REEL DETECTION INPUT
Ⓚ REFERENCE INPUT
+5V
4MHz
RESET +B
(SW ON at "L")
(SW ON at "L")
(SW ON at "L")
(SW ON at "L")
X2 CONTROL (X2 at "L")
REC MUTE CONTROL (MUTE at "H")
AUDIO MUTE CONTROL (MUTE at "H")
(X2 at "L")
DIGITAL MODE CONTROL
(X2, STILL, SLOW, TV STILL at "L")
(SLOW at "H")
(READ at "H")
(SYSTEM CLEAR at "L")
PREPLAY +B CONTROL (PREPLAY +B OUTPUT at "L")
REC +B CONTROL (REC +B OUTPUT at "L")
PLAY +B CONTROL (PLAY +B CONTROL at "L")
Rc
R9
R8
K0
R8
P3
P1
VDD
VHH
X OUT
X IN
RESET

LOADING MOTOR CONTROL

MODE \ FLM	A	B	C
STOP	H	H	H
SLOT IN	L	H	L
SLOT OUT	L	H	H
LOADING	H	L	L
UNLOADING	H	L	H


LOGIC 2 UNIT
CASSETTE DOWN DELAY
QL32
QL31,CL31
START SENSOR
FL MOTOR
END SENSOR
LOADING MOTOR
24 POLES
12 PULSE
1 REEL TABLE
V: 50mV/div.
H: 5ms/div.
24 POLES
12 PULSE
S REEL TABLE
REEL MOTOR
V: 50mV/div.
H: 5ms/div.

Serial Transmission


Period 40ms
START CODE ③
Approx 10ms
CLOCK (58)
DATA (57)(58)
1 2 3 4 5 6 7 8 9 10
Magnnified
START CODE ③
CLOCK (58)
DATA (57)(58)

CONTENTS OF DATA (57)(58)

No.	TRANSMISSION MICROCOMPUTER	DATA
1	TIMER	POWER ON/OFF, COUNTERMEMORY, AUTO SENSOR
2	LOGIC	MODE DATA, TAPE SPEED, REC INHIBIT, ⌧ DISPLAY
3	TIMER	TV/VCR, KEY DATA
4	LOGIC	COUNTER MODE, MODE DATA
5	TIMER	COUNTER, BACK-UP
6	LOGIC	COUNTER
7	TIMER	COUNTER, BACK-UP
8	LOGIC	COUNTER
9	TIMER	CHECK, SUM
10	LOGIC	CHECK, SUM

MICROCOMPUTER TERMINAL FUNCTION

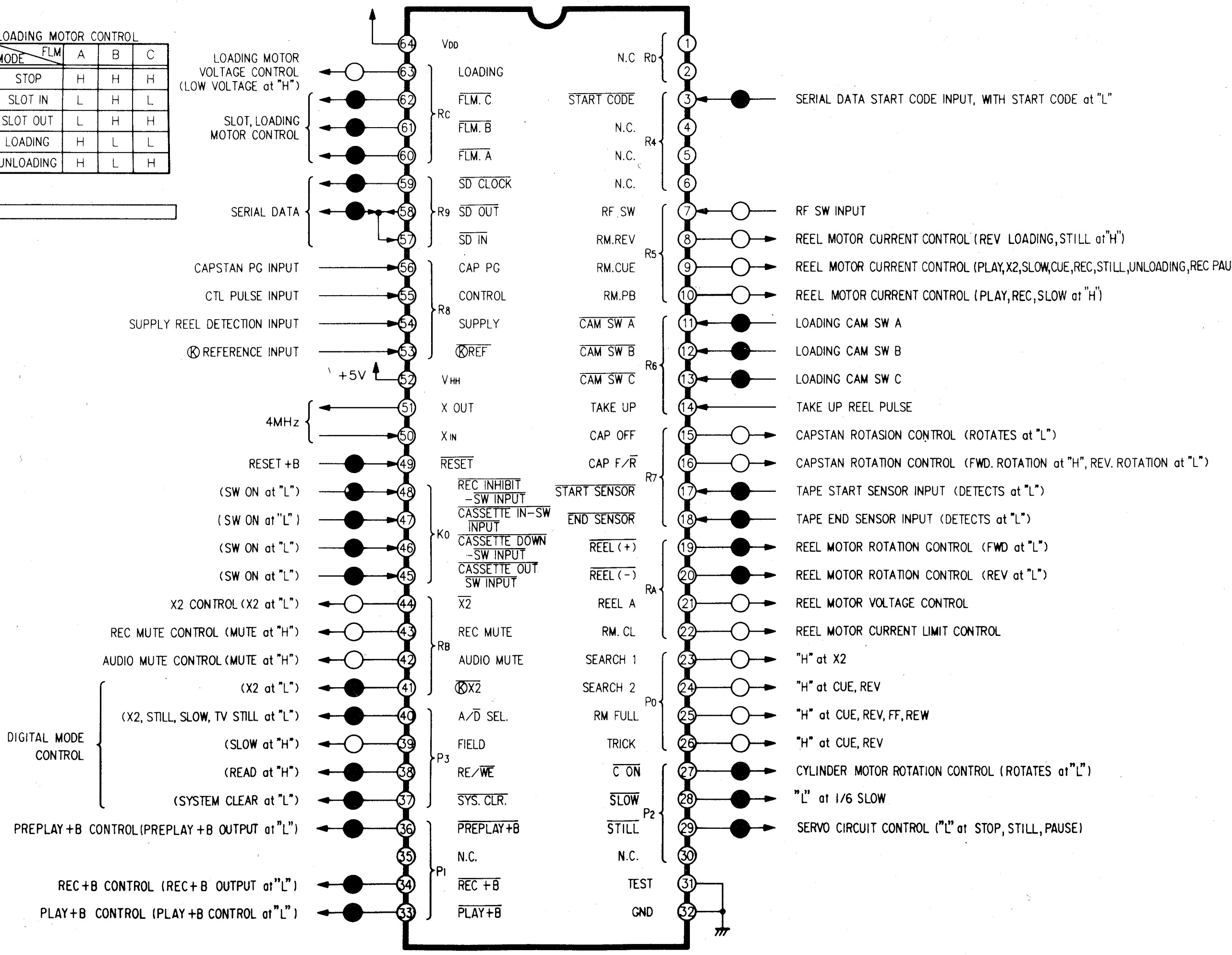
LOADING MOTOR CONTROL

MODE \ FLM	A	B	C
STOP	H	H	H
SLOT IN	L	H	L
SLOT OUT	L	H	H
LOADING	H	L	L
UNLOADING	H	L	H

IC601 Logic Microcomputer TMP47C460AN9238Z

○ : HIGH ACTIVE

● : LOW ACTIVE


64 VDD
63 LOADING
LOADING MOTOR VOLTAGE CONTROL (LOW VOLTAGE at "H")
62 FLM. C
61 FLM. B
60 FLM. A
Rc
SLOT, LOADING MOTOR CONTROL
59 SD CLOCK
58 SD OUT
57 SD IN
R9
SERIAL DATA
56 CAP PG
55 CONTROL
54 SUPPLY
53 ⓀREF
R8
CAPSTAN PG INPUT
CTL PULSE INPUT
SUPPLY REEL DETECTION INPUT
Ⓚ REFERENCE INPUT
+5V
52 VHH
51 X OUT
50 XIN
4MHz
49 RESET
RESET +B
48 REC INHIBIT -SW INPUT
47 CASSETTE IN-SW INPUT
46 CASSETTE DOWN -SW INPUT
45 CASSETTE OUT SW INPUT
K0
(SW ON at "L")
(SW ON at "L")
(SW ON at "L")
(SW ON at "L")
44 X2
43 REC MUTE
42 AUDIO MUTE
41 ⓀX2
RB
X2 CONTROL (X2 at "L")
REC MUTE CONTROL (MUTE at "H")
AUDIO MUTE CONTROL (MUTE at "H")
(X2 at "L")
40 A/D SEL.
39 FIELD
38 RE/WE
37 SYS. CLR.
P3
DIGITAL MODE CONTROL
(X2, STILL, SLOW, TV STILL at "L")
(SLOW at "H")
(READ at "H")
(SYSTEM CLEAR at "L")
36 PREPLAY+B
35 N.C.
34 REC +B
33 PLAY+B
P1
PREPLAY +B CONTROL (PREPLAY +B OUTPUT at "L")
REC+B CONTROL (REC+B OUTPUT at "L")
PLAY+B CONTROL (PLAY +B CONTROL at "L")
1 N.C
2
RD
3 START CODE
4 N.C.
5 N.C.
6 N.C.
R4
SERIAL DATA START CODE INPUT, WITH START CODE at "L"
7 RF SW
8 RM.REV
9 RM.CUE
10 RM.PB
R5
RF SW INPUT
REEL MOTOR CURRENT CONTROL (REV LOADING, STILL at "H")
REEL MOTOR CURRENT CONTROL (PLAY, X2, SLOW, CUE, REC, STILL, UNLOADING, REC PAUSE at "H")
REEL MOTOR CURRENT CONTROL (PLAY, REC, SLOW at "H")
11 CAM SW A
12 CAM SW B
13 CAM SW C
14 TAKE UP
R6
LOADING CAM SW A
LOADING CAM SW B
LOADING CAM SW C
TAKE UP REEL PULSE
15 CAP OFF
16 CAP F/R
17 START SENSOR
18 END SENSOR
R7
CAPSTAN ROTASION CONTROL (ROTATES at "L")
CAPSTAN ROTATION CONTROL (FWD. ROTATION at "H", REV. ROTATION at "L")
TAPE START SENSOR INPUT (DETECTS at "L")
TAPE END SENSOR INPUT (DETECTS at "L")
19 REEL (+)
20 REEL (-)
21 REEL A
22 RM. CL
RA
REEL MOTOR ROTATION CONTROL (FWD at "L")
REEL MOTOR ROTATION CONTROL (REV at "L")
REEL MOTOR VOLTAGE CONTROL
REEL MOTOR CURRENT LIMIT CONTROL
23 SEARCH 1
24 SEARCH 2
25 RM FULL
26 TRICK
P0
"H" at X2
"H" at CUE, REV
"H" at CUE, REV, FF, REW
"H" at CUE, REV
27 C ON
28 SLOW
29 STILL
30 N.C.
P2
CYLINDER MOTOR ROTATION CONTROL (ROTATES at "L")
"L" at 1/6 SLOW
SERVO CIRCUIT CONTROL ("L" at STOP, STILL, PAUSE)
31 TEST
32 GND

Logic Mode Shift Table

CURRENT MODE \ INPUT MODE	EJECT	REC	STOP	PAUSE	PLAY	REW	FF	TIMER REC	REMOTE CONTROL X2 SPEED PLAY	REMOTE CONTROL 1/6 SLOW	TV STILL
SLOT IN	○	×	—	×	○	○	○	EJECT	○	×	○
SLOT OUT	—	×	×	×	×	×	×	×	×	×	○
STOP	○	○	—	×	○	○	○	○	○	×	○
PLAY	○	×	○	STILL	—	REVIEW	CUE	○	○	○	×
CUE	○	×	○	×	○	REVIEW	—	○	×	×	×
REVIEW	○	×	○	×	○	—	CUE	○	×	×	×
FF	○	×	○	×	○	○	—	○	○	×	○
REW	○	×	○	×	○	—	○	○	○	×	○
STILL PICTURE	○	REC PAUSE	○	PLAY	×	REVIEW	CUE	○	○	○	×
REC	×	—	○	REC PAUSE	×	×	×	○	×	×	×
REC PAUSE	×	×	○	REC	×	×	×	○	×	×	×
X2 SPEED PLAY	○	×	○	STILL	○	REVIEW	CUE	○	—	○	×
1/6 SLOW	○	×	○	STILL	○	REVIEW	CUE	○	○	—	×
TIMER REC	×	×	×	×	×	×	×	—	×	×	×
TV STILL	○	○#	○	×	○#	○	○	○#	○#	×	#

Note: 1/6 SLOW AND X2 PLAY MODES CAN BE OPERATED BY REMOTE CONTROLLER. REMOTE CONTROL IS PRIOR TO MAIN UNIT SW.

#: TV STILL IS RELEASED.

IC601 (TMP47C460AN9238Z) Logic Microcomputer Output Polarity

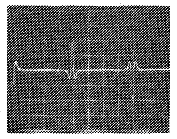
∗: DEPENDS ON MODE

PIN No.	PIN \ MODE	SLOT IN	SLOT OUT	LOADING	UNLOADING	STOP	FF	REW	PLAY	X2	STILL	1/6 SLOW	CUE	REVIEW	REC	REC PAUSE	POWER OFF	TV STILL
10	RM.PB	L	L	L	L	L	L	L	H	L	L	H	L	L	H	L	L	L
8	RM.REV	L	L	H	L	L	L	L	L	L	H	L	L	H	L	L	L	L
9	RM.CUE	L	L	L	H	L	L	L	H	H	H	H	H	L	H	H	L	∗
44	$\overline{X2}$	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	L	H
15	CAP OFF	H	H	H	H	H	H	H	L	L	H	L	L	L	L	H	H	H
16	CAP F/$\overline{R}$	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H
19	$\overline{\text{REEL (+)}}$	H	H	L	H	H	L	H	L	L	L	L	L	H	L	H	H	∗
20	$\overline{\text{REEL (-)}}$	H	H	H	L	H	H	L	H	H	H	H	H	L	H	H	H	∗
21	REEL A	H	H	L	L	L	L	L	L	L	H	L	⊓⊓⊓	⊓⊓⊓	L	H	H	∗
22	RM.CL	L	L	L	H	L	L	L	H	H	L	H	H	H	H	L	L	∗
23	SEARCH 1	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L
24	SEARCH 2	L	L	L	L	L	L	L	L	L	L	L	H	H	L	L	L	L
25	RM.FULL	L	L	L	L	L	H	H	L	L	L	L	H	H	L	L	L	∗
33	$\overline{\text{PLAY +B}}$	H	H	H	H	H	H	H	L	L	L	L	L	L	H	H	H	H
34	$\overline{\text{REC +B}}$	H	H	∗	∗	H	H	H	H	H	H	H	H	H	L	L	H	H
36	$\overline{\text{PREPLAY +B}}$	H	H	∗	∗	H	H	H	L	L	L	L	L	L	H	H	H	H
27	$\overline{\text{CYLINDER ON}}$	H	H	L	L	H	H	H	L	L	L	L	L	L	L	L	H	∗
28	$\overline{\text{SLOW}}$	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H
29	$\overline{\text{STILL}}$	L	L	L	L	L	L	L	H	H	L	H	H	H	H	L	L	L
43	REC MUTE	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	L	H
42	AUDIO MUTE	L	L	L	L	L	L	L	L	L	H	H	H	H	L	L	L	L
26	TRICK	L	L	L	L	L	L	L	L	L	L	L	H	H	L	L	L	L
37	$\overline{\text{SYS. CLR.}}$	L	L	L	L	L	L	L	L	H	H	H	L	L	L	L	L	H
38	RE/$\overline{\text{WE}}$	L	L	L	L	L	L	L	L	⊔⊔⊔⊔	H	⊔⊓⊔	L	L	L	L	L	H
39	FIELD	L	L	L	L	L	L	L	L	L	∗	H	L	L	L	L	L	L
40	A/$\overline{D}$ SEL.	H	H	H	H	H	H	H	H	L	L	L	H	H	H	H	L	L
41	$\overline{\text{ⓀX2}}$	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	L	H

11-1. Servo Block Diagram

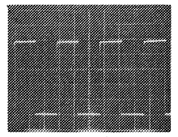
Cylinder Servo

1



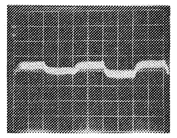
V: 0.5V/div.
H: 5ms/div.

2



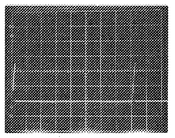
V: 1V/div.
H: 10μs/div.

3



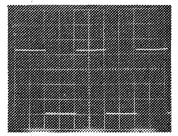
V: 0.1V/div.
H: 10ms/div.

4



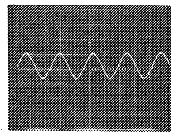
V: 1V/div.
H: 5ms/div.

5



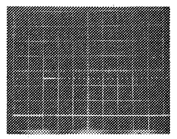
V: 1V/div.
H: 10ms/div.

6



V: 0.2V/div.
H: 0.1μs/div.

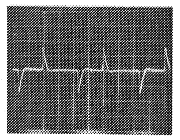
7



V: 2V/div.
H: 0.2ms/div.

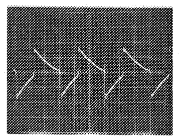
Capstan Servo

❶ **(Play)**



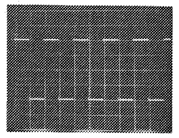
V: 0.5V/div.
H: 10ms/div.

❷ **(Cue/Review)**



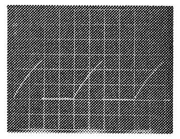
V: 0.5V/div.
H: 2ms/div.

❸



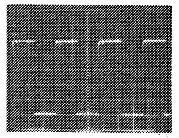
V: 1V/div.
H: 1ms/div.

❹



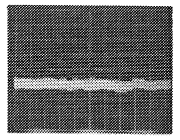
V: 1V/div.
H: 10ms/div.

❺

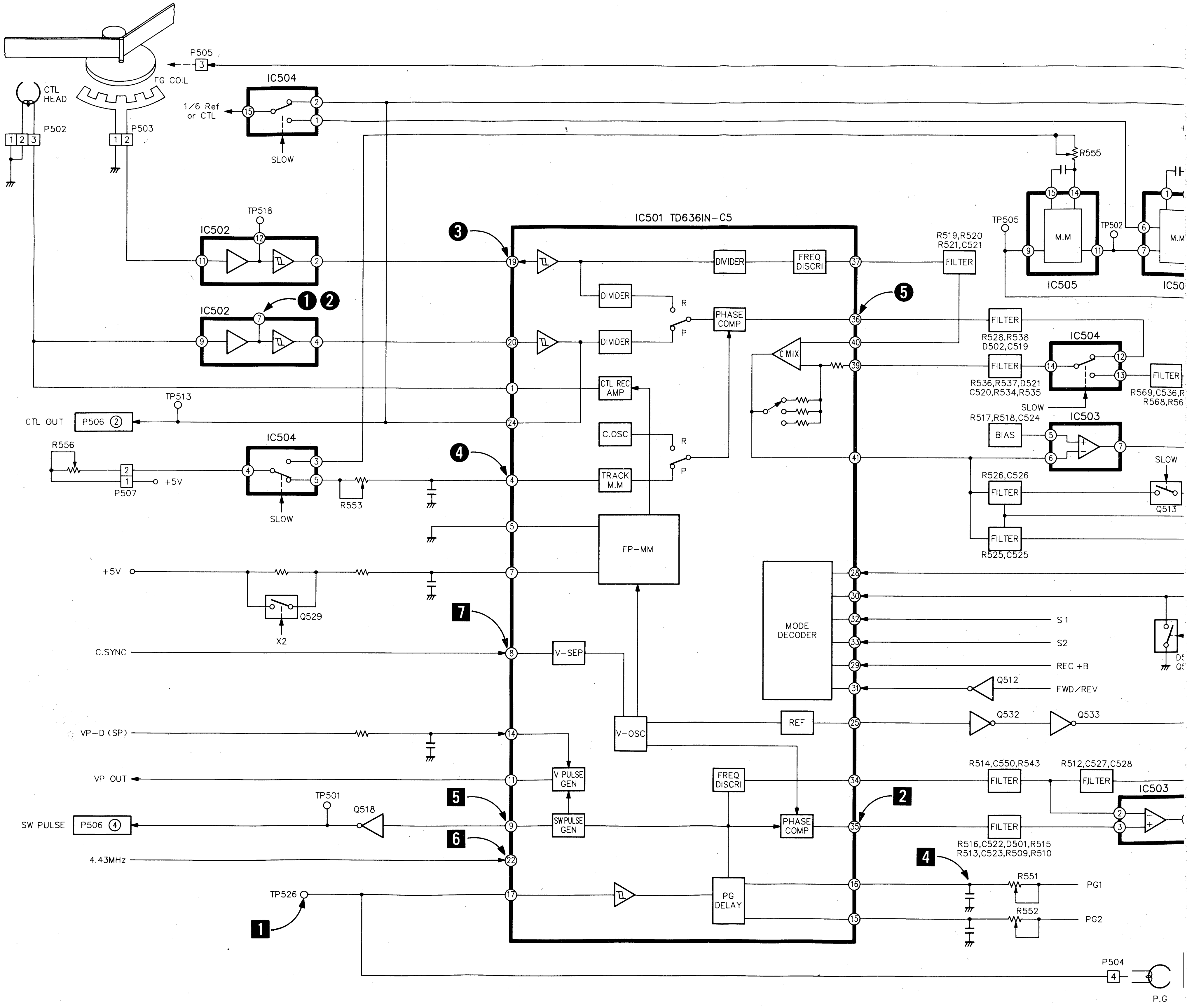


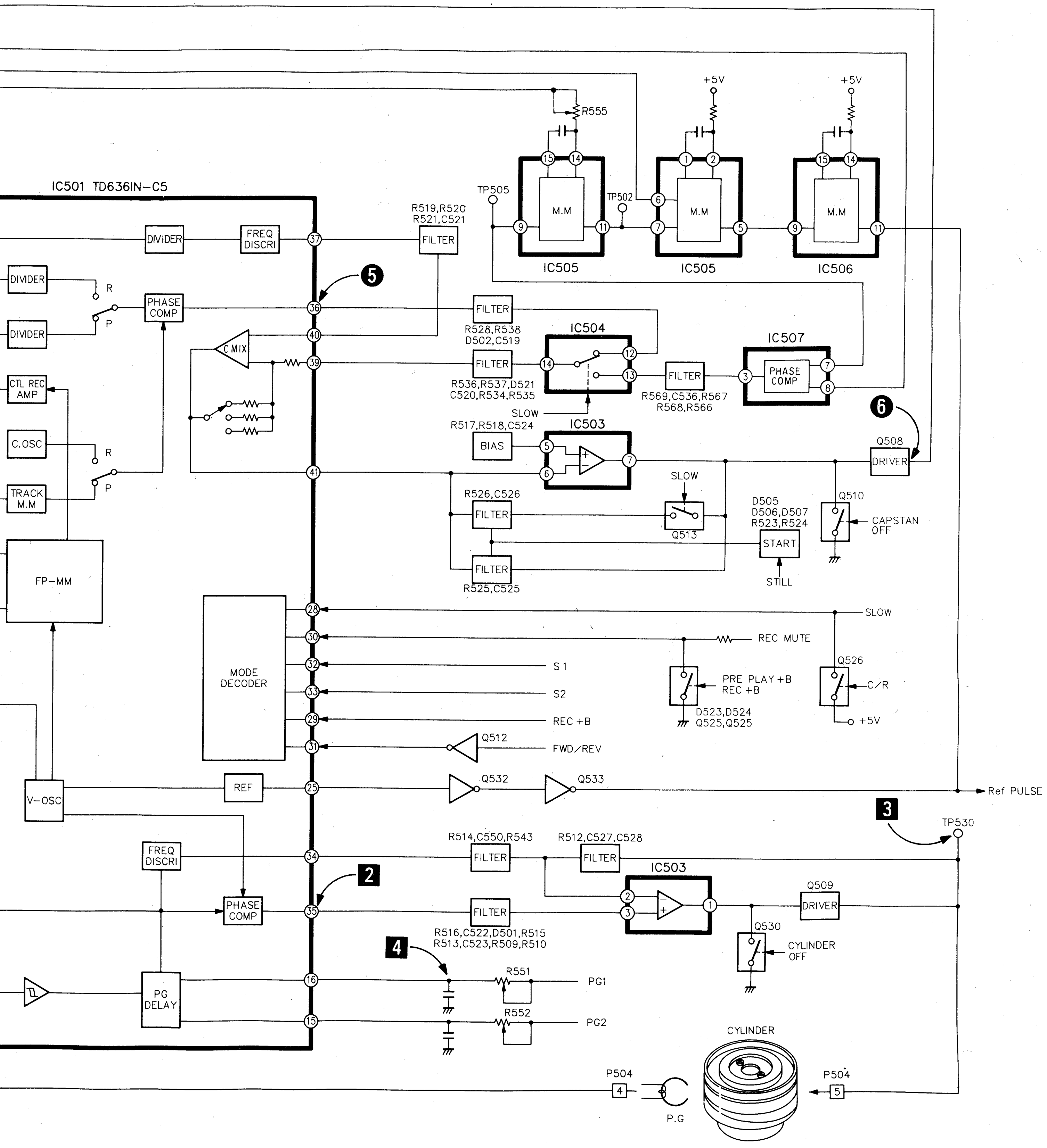
V: 1V/div.
H: 10μs/div.

❻ **(Play)**



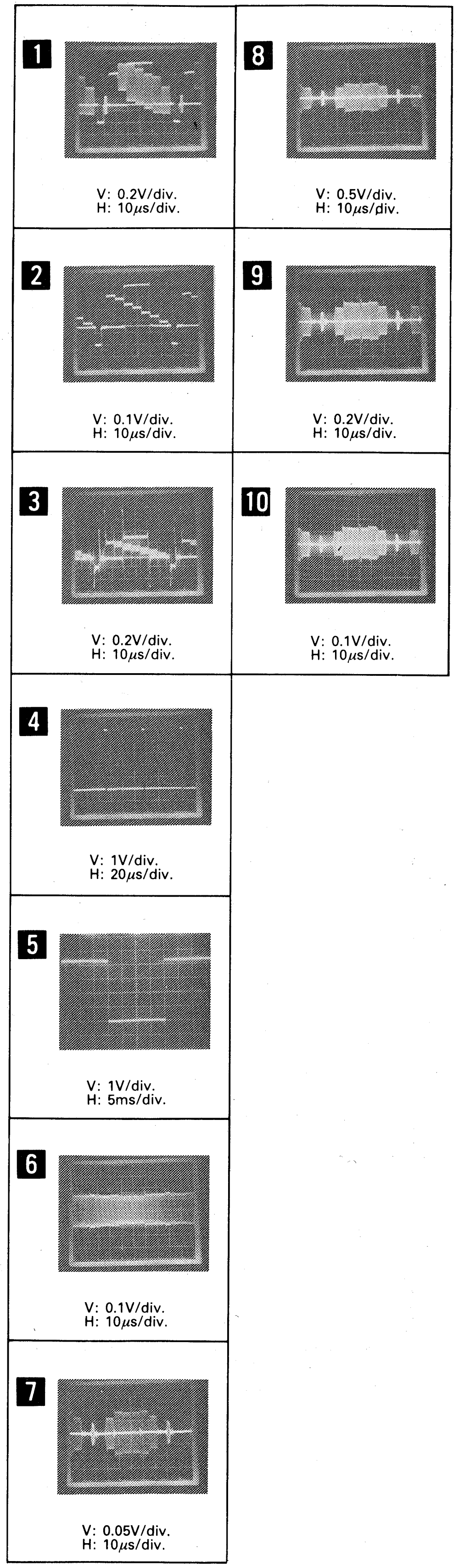
V: 1V/div
H: 5ms/div.


P505
CTL HEAD
FG COIL
P502
P503
IC504
1/6 Ref or CTL
SLOW
R555
TP505
TP502
M.M
IC505
IC501 TD636IN-C5
TP518
IC502
❶❷
DIVIDER
FREQ DISCRI
R519,R520
R521,C521
FILTER
R
P
PHASE COMP
C MIX
CTL REC AMP
C.OSC
TRACK M.M
FP-MM
R528,R538
D502,C519
R536,R537,D521
C520,R534,R535
SLOW
IC503
R517,R518,C524
BIAS
R569,C536
R568
R526,C526
R525,C525
Q513
TP513
CTL OUT
P506 ②
R556
P507
+5V
R553
Q529
X2
MODE DECODER
S1
S2
REC +B
FWD/REV
Q512
Q532
Q533
C.SYNC
V-SEP
VP-D (SP)
V-OSC
REF
VP OUT
V PULSE GEN
SW PULSE
P506 ④
TP501
Q518
SW PULSE GEN
FREQ DISCRI
PHASE COMP
R514,C550,R543
R512,C527,C528
R516,C522,D501,R515
R513,C523,R509,R510
4.43MHz
TP526
PG DELAY
R551
R552
PG1
PG2
P504
P.G
1
2
3
4
5
6
7

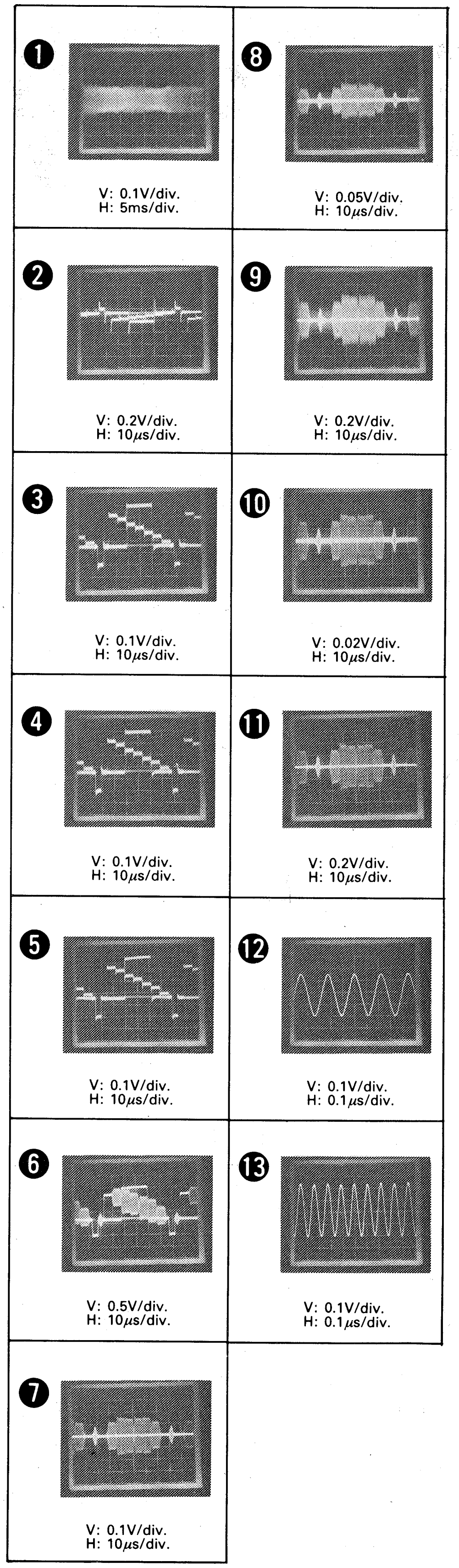

IC501 TD636IN-C5
DIVIDER
FREQ DISCRI
DIVIDER
DIVIDER
R
P
PHASE COMP
C MIX
CTL REC AMP
C.OSC
R
P
TRACK M.M
FP-MM
MODE DECODER
REF
V-OSC
FREQ DISCRI
PHASE COMP
PG DELAY
37
36
40
39
41
28
30
32
33
29
31
25
34
35
16
15
R519,R520
R521,C521
FILTER
TP505
+5V
+5V
R555
M.M
IC505
TP502
M.M
IC505
M.M
IC506
❺
FILTER
R528,R538
D502,C519
IC504
FILTER
R536,R537,D521
C520,R534,R535
SLOW
FILTER
R569,C536,R567
R568,R566
IC507
PHASE COMP
R517,R518,C524
BIAS
IC503
❻
Q508
DRIVER
SLOW
R526,C526
FILTER
Q513
D505
D506,D507
R523,R524
START
STILL
Q510
CAPSTAN OFF
FILTER
R525,C525
SLOW
REC MUTE
Q526
PRE PLAY +B
REC +B
C/R
D523,D524
Q525,Q525
+5V
S1
S2
REC +B
Q512
FWD/REV
Q532
Q533
Ref PULSE
3
TP530
R514,C550,R543
FILTER
R512,C527,C528
FILTER
IC503
2
FILTER
Q509
DRIVER
R516,C522,D501,R515
R513,C523,R509,R510
Q530
CYLINDER OFF
4
R551
PG1
R552
PG2
CYLINDER
P504
P504
P.G

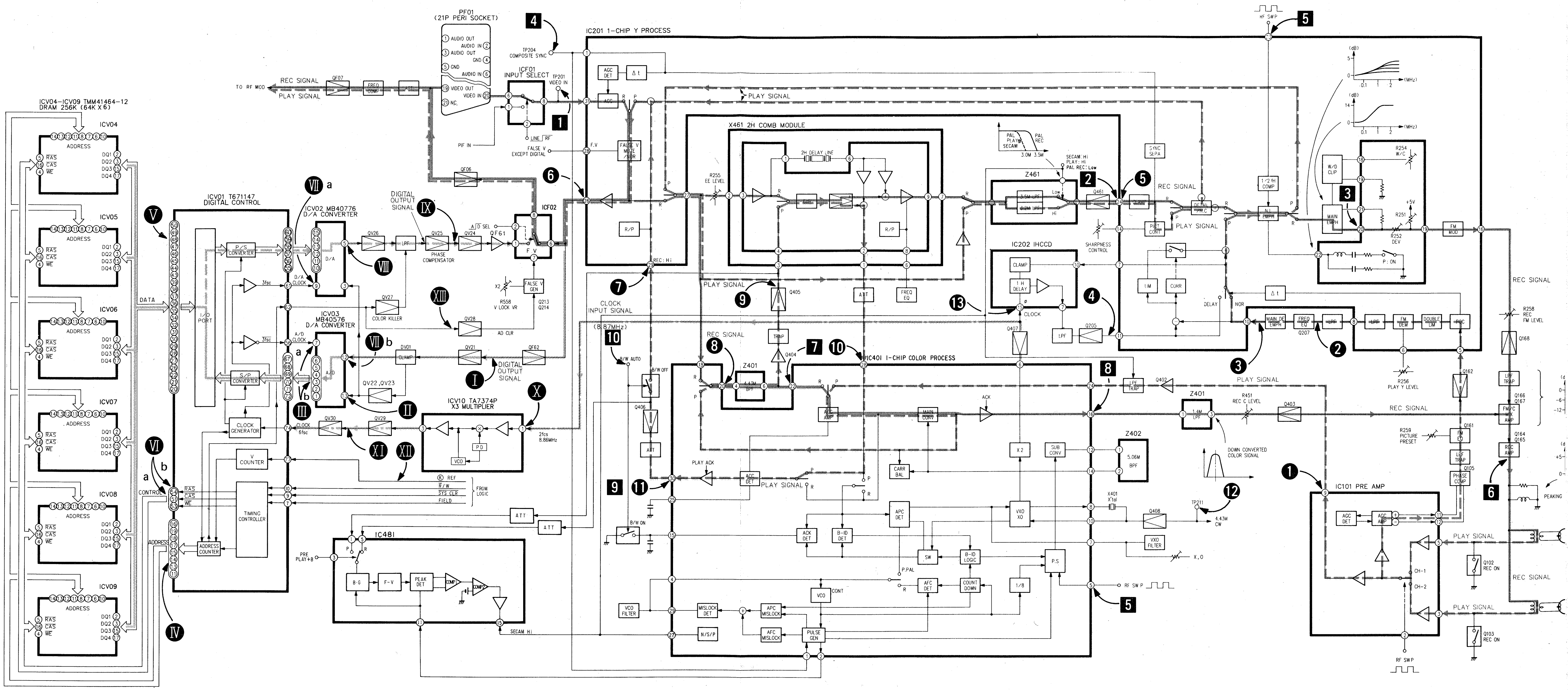
12-1. Video Block Diagram

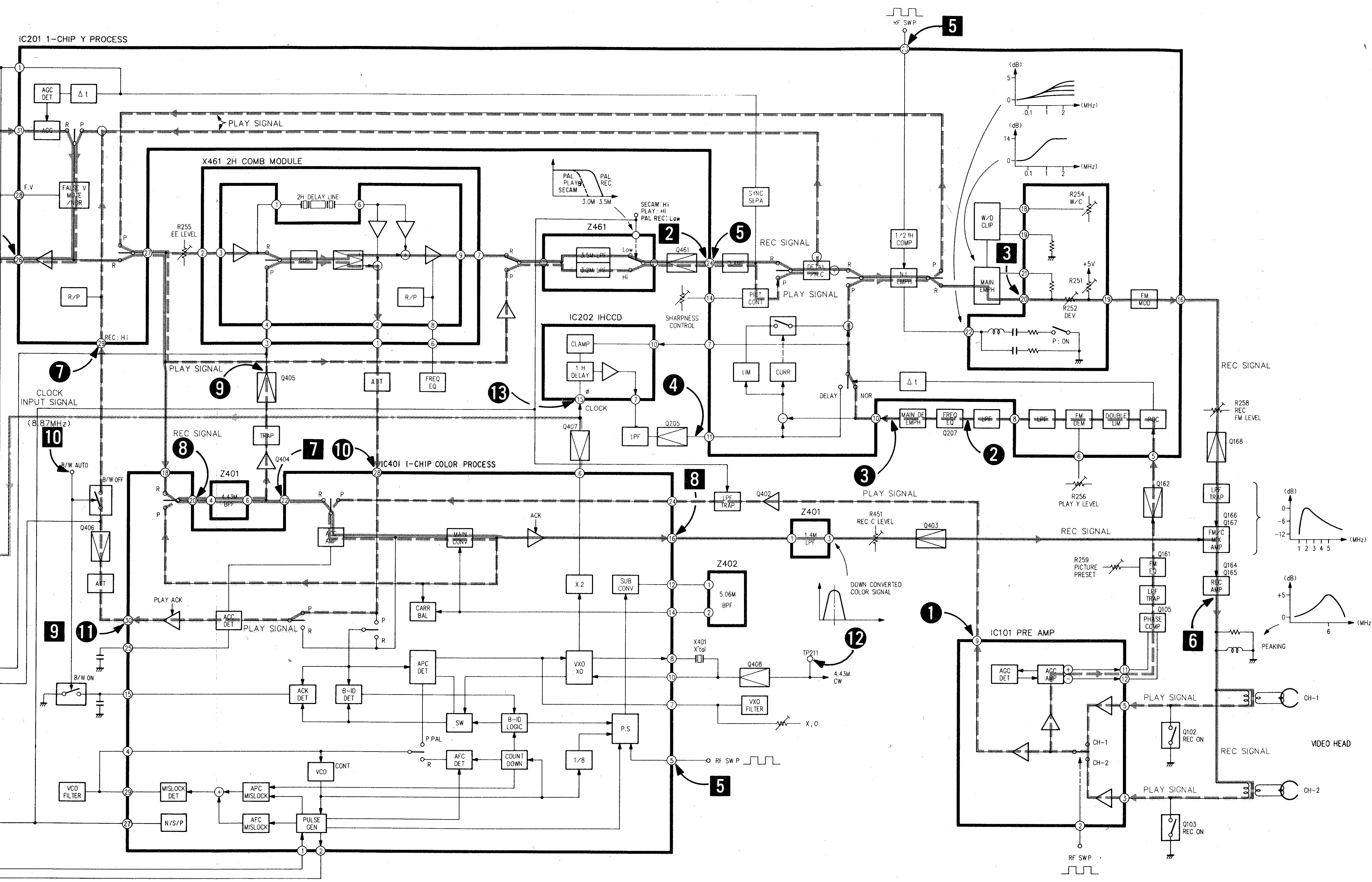
Record Mode



Playback Mode

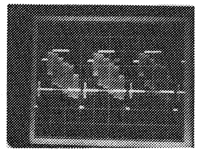



ICV04–ICV09 TMM41464–12
DRAM 256K (64K X 6)
ICV04
ICV05
ICV06
ICV07
ICV08
ICV09
ADDRESS
RAS
CAS
WE
DQ1
DQ2
DQ3
DQ4
DATA
CONTROL
ADDRESS
ICV01 T671147
DIGITAL CONTROL
I/O PORT
P/S CONVERTER
S/P CONVERTER
CLOCK GENERATOR
V COUNTER
TIMING CONTROLLER
ADDRESS COUNTER
3fsc
ICV02 MB40776
D/A CONVERTER
ICV03
MB40576
D/A CONVERTER
D/A CLOCK
A/D CLOCK
D/A
A/D
DIGITAL OUTPUT SIGNAL
QV26
QV25
QV24
QF61
LPF
PHASE COMPENSATOR
A/D SEL
ICF02
FALSE V GEN
R558
V LOCK VR
Q213
Q214
QV27
COLOR KILLER
QV28
AD CLR
DV01
CLAMP
QV21
QF62
QV22, QV23
DIGITAL OUTPUT SIGNAL
ICV10 TA7374P
X3 MULTIPLIER
QV30
QV29
CLOCK
6fsc
VCO
P.D
2fcs
8.86MHz
Ⓡ REF
R/W
SYS CLR
FIELD
FROM LOGIC
IC481
PRE PLAY+8
B·G
F-V
PEAK DET
COMP
COMP2
SECAM Hi
ATT
PF01
(21P PERI SOCKET)
AUDIO OUT
AUDIO IN
GND
VIDEO OUT
VIDEO IN
NC
TO RF MOD
REC SIGNAL
PLAY SIGNAL
QF07
FREQ COMP
QF06
PIF IN
ICF01
INPUT SELECT
TP201
VIDEO IN
LINE
RF
FALSE V
EXCEPT DIGITAL
TP204
COMPOSITE SYNC
IC201 1-CHIP Y PROCESS
AGC DET
AGC
Δt
F.V
FALSE V MUTE / NOR
R/P
REC : Hi
CLOCK INPUT SIGNAL
(8.87MHz)
B/W AUTO
B/W OFF
B/W ON
Q406
ATT
PLAY ACK
R255
EE LEVEL
X461 2H COMB MODULE
2H DELAY LINE
R/P
ATT
FREQ EQ
PLAY SIGNAL
Q405
TRAP
Q404
REC SIGNAL
Z401
4.43M BPF
IC401 1-CHIP COLOR PROCESS
ACC AMP
MAIN CONV
ACK
CARR BAL
ACC DET
ACK DET
B-ID DET
APC DET
SW
B-ID LOGIC
P.PAL
AFC DET
COUNT DOWN
VCO
CONT
VCO FILTER
MISLOCK DET
APC MISLOCK
AFC MISLOCK
N/S/P
PULSE GEN
X2
SUB CONV
VXO XO
P.S
1/8
Z402
5.06M BPF
X401
X'tal
Q408
TP211
4.43M CW
VXO FILTER
X, O
RF SW P
PAL PLAY SECAM
PAL REC
3.0M 3.5M
SECAM : Hi
PLAY : Hi
PAL REC : Low
Z461
3.5M LPF
Low
Hi
Q461
CLAMP
SHARPNESS CONTROL
IC202 IHCCD
CLAMP
1 H DELAY
CLOCK
Q407
LPF
Q205
SYNC SEPA
PICT CONT
DETAIL / Y/C
REC SIGNAL
PLAY SIGNAL
LIM
CUKR
DELAY
NOR
Δt
MAIN DE EMPH
FREQ EQ
Q207
LPF
FM DEM
DOUBLE LIM
R256
PLAY Y LEVEL
HF SWP
1/2 fH COMP
N.L EMPH
MAIN EMPH
W/D CLIP
R254
W/C
R251
R252
DEV
P : ON
+5V
FM MOD
(dB)
(MHz)
0.1
1
2
5
0
14
LPF TRAP
Q402
Z401
1.4M LPF
R451
REC C LEVEL
Q403
REC SIGNAL
DOWN CONVERTED COLOR SIGNAL
REC SIGNAL
R258
REC FM LEVEL
Q168
LPF TRAP
Q166
Q167
FM/C MIX AMP
R259
PICTURE PRESET
Q162
FM EQ
Q161
LPF TRAP
PHASE COMP
Q105
Q164
Q165
REC AMP
PEAKING
IC101 PRE AMP
AGC DET
AGC AMP
CH-1
CH-2
PLAY SIGNAL
Q102
REC ON
Q103
REC ON
REC SIGNAL
RF SWP
Ⅰ
Ⅱ
Ⅲ
Ⅳ
Ⅴ
Ⅵ
Ⅶ
Ⅷ
Ⅸ
Ⅹ
Ⅺ
Ⅻ
ⅩⅢ
a
b
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
1
2
3
4
5
6
7
8
9
10
(d
0
-6
-12
+5
0


IC201 1-CHIP Y PROCESS
AGC DET
Δ t
AGC
R P
PLAY SIGNAL
F.V
FALSE V MUTE /NOR
R/P
REC : Hi
X461 2H COMB MODULE
2H DELAY LINE
R255 EE LEVEL
6dB
ATT
FREQ EQ
Q405
PAL PLAY SECAM
PAL REC
3.0M 3.5M
SECAM : Hi
PLAY : Hi
PAL REC : Low
Z461
3.5M LPF
3.2M LPF
Low
Hi
Q461
CLAMP
SHARPNESS CONTROL
IC202 IHCCD
CLAMP
1 H DELAY
CLOCK
Q407
LPF
Q205
SYNC SEPA
REC SIGNAL
DETAIL /N.C
PICT CONT
PLAY SIGNAL
LIM
CORR
DELAY
NOR
Δ t
MAIN DE EMPH
FREQ EQ
Q207
LPF
LPF
FM DEM
DOUBLE LIM
ROC
1/2 fH COMP
N.L EMPH
RF SWP
(dB)
5
0
0.1
1
2
(MHz)
14
W/D CLIP
MAIN EMPH
R254 W/C
+5V
R251
R252 DEV
P : ON
FM MOD
R256 PLAY Y LEVEL
Q162
REC SIGNAL
R258 REC FM LEVEL
Q168
LPF TRAP
Q166 Q167
FM/C MIX AMP
-6
-12
1 2 3 4 5
CLOCK INPUT SIGNAL
(8.87MHz)
B/W AUTO
B/W OFF
Q406
ATT
B/W ON
REC SIGNAL
TRAP
Q404
IC401 I-CHIP COLOR PROCESS
Z401
4.43M BPF
ACC AMP
MAIN CONV
ACK
CARR BAL
PLAY ACK
ACC DET
ACK DET
B-ID DET
APC DET
SW
B-ID LOGIC
P.PAL
AFC DET
COUNT DOWN
1/8
P.S
X2
SUB CONV
VXO XO
VCO
CONT
VCO FILTER
MISLOCK DET
APC MISLOCK
AFC MISLOCK
PULSE GEN
N/S/P
Z402
5.06M BPF
X401 X'tal
Q408
TP211
4.43M CW
VXO FILTER
X, O
RF SW P
LPF TRAP
Q402
Z401
1.4M LPF
R451 REC C LEVEL
Q403
DOWN CONVERTED COLOR SIGNAL
IC101 PRE AMP
AGC DET
ACC AMP
CH-1
CH-2
RF SWP
R259 PICTURE PRESET
FM EQ
Q161
LPF TRAP
PHASE COMP
Q105
Q164 Q165
REC AMP
+5
6
PEAKING
Q102 REC ON
Q103 REC ON
VIDEO HEAD
CH-1
CH-2
❶ 2 ❷ 3 ❸ ❹ 5 ❺ 6 7 ❼ 8 ❽ 9 ❾ 10 ❿ ⓫ ⓬ ⓭

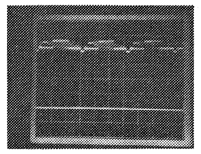
Digital

Ⅰ



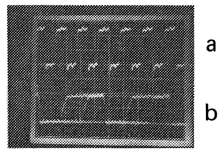
V: 0.5V/div.
H: 20μs/div.

Ⅱ



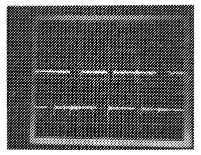
V: 1.0V/div.
H: 20μs/div.

Ⅲ



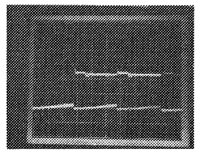
V: 2.0V/div.
H: 50ns/div.

Ⅳ



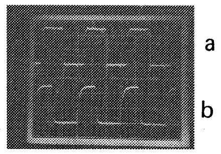
V: 2.0V/div.
H: 100ns/div.

Ⅴ



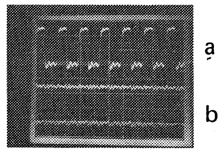
V: 2.0V/div.
H: 100ns/div.

Ⅵ



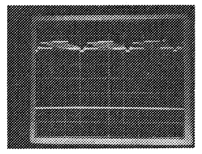
V: 2.0V/div.
H: 100ns/div.

Ⅶ



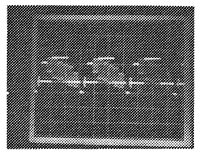
V: 2.0V/div.
H: 50ns/div.

Ⅷ



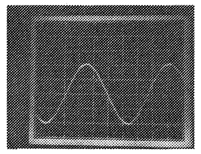
V: 1.0V/div.
H: 20μs/div.

Ⅸ



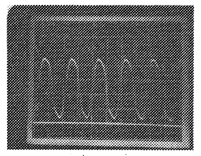
V: 200mV/div.
H: 20μs/div.

Ⅹ



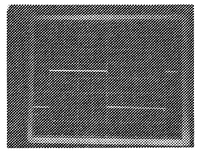
V: 200mV/div.
H: 20ns/div.

Ⅺ



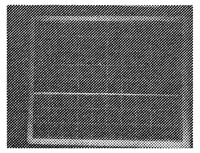
V: 1.0V/div.
H: 20ns/div.

Ⅻ



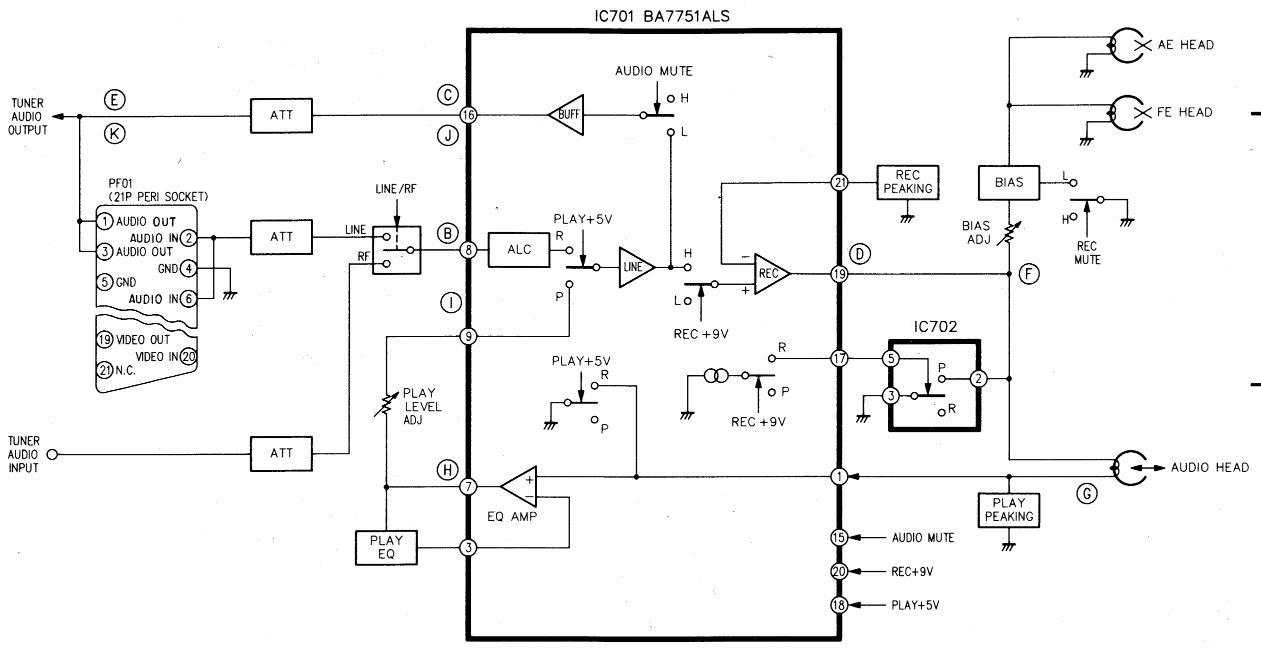
V: 2.0V/div.
H: 5ms/div.

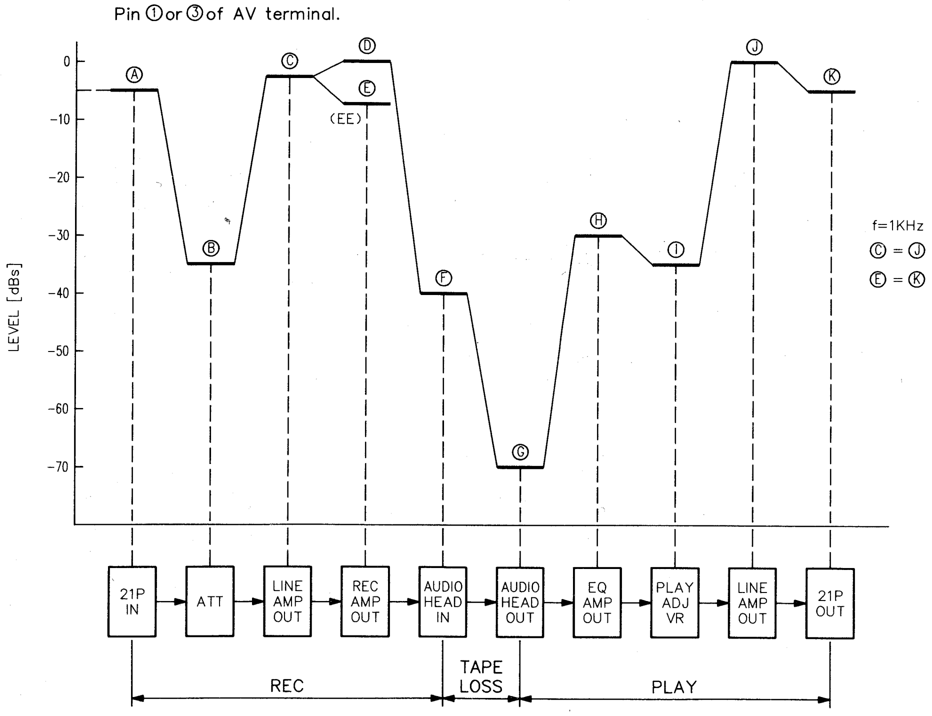
XIII



V: 2.0V/div.
H: 5ms/div.

14-1. Audio Block Diagram

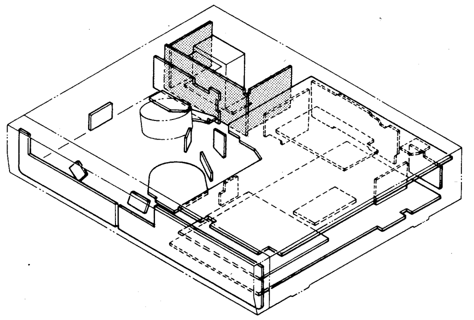

IC701 BA7751ALS
TUNER AUDIO OUTPUT
Ⓔ
Ⓚ
ATT
PF01 (21P PERI SOCKET)
① AUDIO OUT
AUDIO IN ②
③ AUDIO OUT
GND ④
⑤ GND
AUDIO IN ⑥
⑲ VIDEO OUT
VIDEO IN ⑳
㉑ N.C.
LINE/RF
LINE
RF
TUNER AUDIO INPUT
PLAY LEVEL ADJ
PLAY EQ
Ⓒ
Ⓙ
Ⓑ
Ⓘ
Ⓗ
AUDIO MUTE
BUFF
H
L
ALC
PLAY+5V
LINE
REC+9V
REC
EQ AMP
PLAY+5V
R
P
REC +9V
REC PEAKING
Ⓓ
IC702
BIAS
BIAS ADJ
REC MUTE
Ⓕ
AE HEAD
FE HEAD
AUDIO HEAD
PLAY PEAKING
Ⓖ
AUDIO MUTE
REC+9V
PLAY+5V



1 2 3 4 5 6 7

A B C D E F G

7-2. Power Supply PC Board



Voltage and Location of Transistors

Symbol No.	Q801			Q802			Q803			Q804			Q812		
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STAND-BY	0	0.8	1.28	0	0	4.5	0	4.5	0	9.7	1.8	9.7	12.0	18.4	12.6
EE	0	0.8	1.28	0	4.0	0	0	0	2.0	9.2	1.8	9.2	12.0	18.0	12.6
PLAY	0	15.9	0	0	4.0	0	0	0	2.0	9.0	1.8	9.0	12.0	17.5	12.6
REC	0	15.4	0	0	4.0	0	0	0	2.0	9.0	1.8	9.0	12.0	17.5	12.6
LOCATION	E-8			F-7			F-8			E-7			D-11		

Location of Diodes

Symbol No.	Location
D801	F-7
D802	F-7
D803	F-7
D804	F-7
D805	F-6
D806	F-6
D807	F-6
D808	F-6
D809	E-7
D810	F-8
D821	D-9
D822	D-9
D824	D-10
D825	D-10

Location of IC

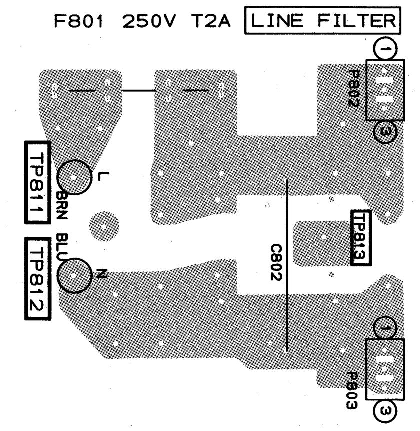
Symbol No.	Location
IC811	D-10

Location of Adjus

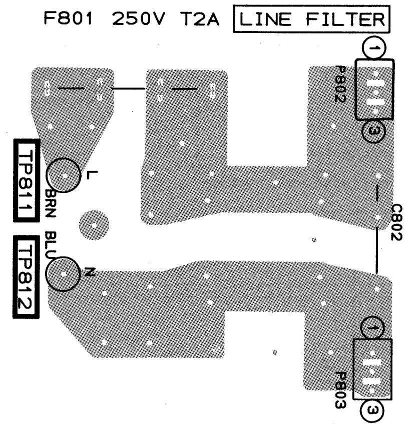
Symbol No.	Location
R851	C-10

To U
PC B

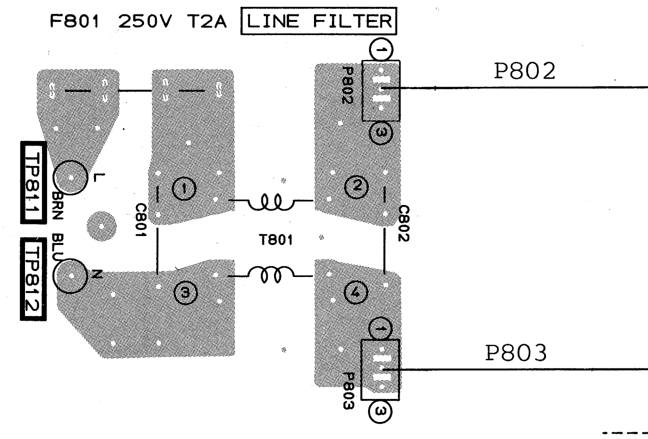
To RG01 Dew Hea


F801 250V T2A
LINE FILTER
P802
P803
TP811
TP812
TP813
BRN
BLU
L
N
C802
①
③

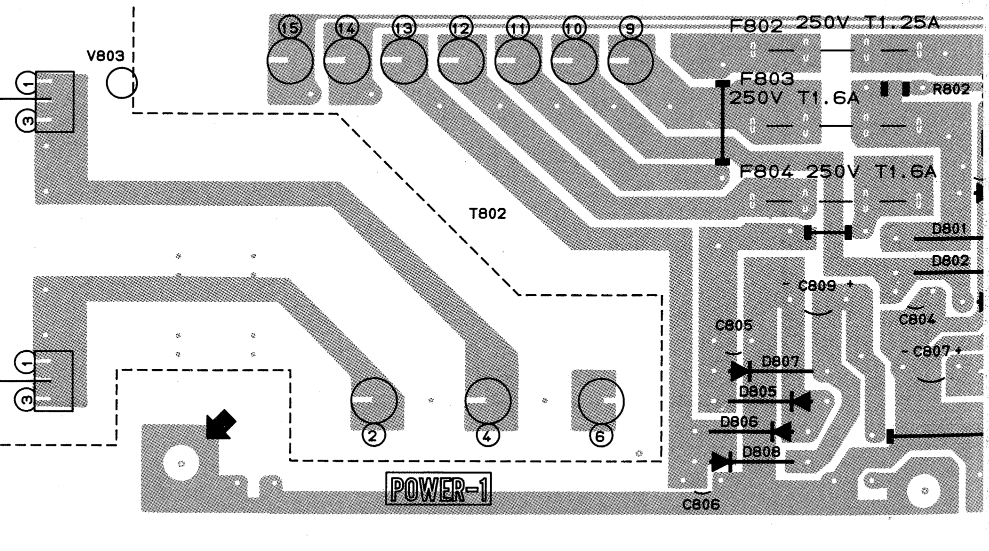
U804 Line Filter PC Board
(DV-90W)


F801 250V T2A
LINE FILTER
P802
P803
TP811
TP812
BRN
BLU
L
N
C802
①
③

U804 Line Filter PC Board
(DV-90T)

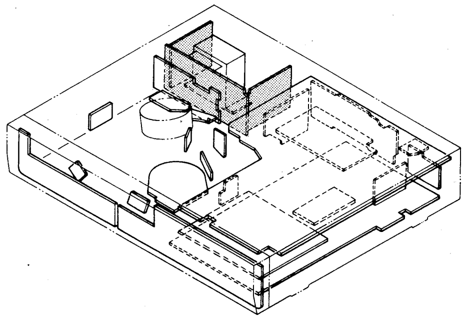

F801 250V T2A
LINE FILTER
P802
P803
TP811
TP812
BRN
BLU
L
N
C801
C802
T801
①
②
③
④

U804 Line Filter PC Board
(DV-90G)


V803
⑮
⑭
⑬
⑫
⑪
⑩
⑨
F802 250V T1.25A
F803 250V T1.6A
R802
F804 250V T1.6A
T802
D801
D802
C809
C805
C804
C807
D807
D805
D806
D808
C806
②
④
⑥
POWER-1

U802 Power PC Board

7-2. Power Supply PC Board



Voltage and Location of Transistors (Unit:V)

Symbol No.	Q801			Q802			Q803			Q804			Q812			Q813			Q814		
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STAND-BY	0	0.8	1.28	0	0	4.5	0	4.5	0	9.7	1.8	9.7	12.0	18.4	12.6	0	17.5	0	0	9.9	0
EE	0	0.8	1.28	0	4.0	0	0	0	2.0	9.2	1.8	9.2	12.0	18.0	12.6	9.0	16.5	9.6	5.0	8.8	5.6
PLAY	0	15.9	0	0	4.0	0	0	0	2.0	9.0	1.8	9.0	12.0	17.5	12.6	9.0	15.7	9.6	5.0	8.9	5.6
REC	0	15.4	0	0	4.0	0	0	0	2.0	9.0	1.8	9.0	12.0	17.5	12.6	9.0	15.5	9.6	5.0	8.7	5.6
LOCATION	E-8			F-7			F-8			E-7			D-11			D-11			E-10		

Location of Diodes

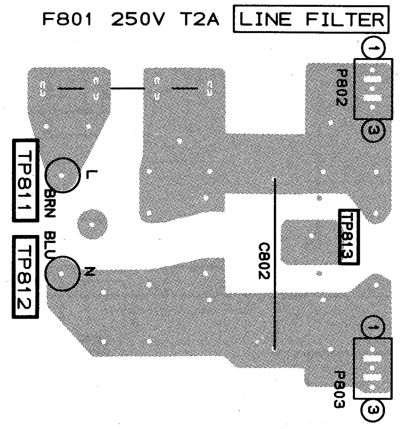
Symbol No.	Location
D801	F-7
D802	F-7
D803	F-7
D804	F-7
D805	F-6
D806	F-6
D807	F-6
D808	F-6
D809	E-7
D810	F-8
D821	D-9
D822	D-9
D824	D-10
D825	D-10

Location of IC

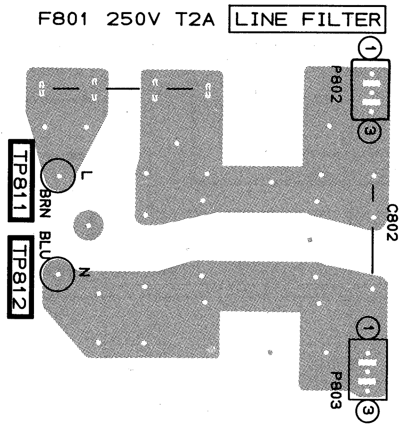
Symbol No.	Location
IC811	D-10

Location of Adjusting VR

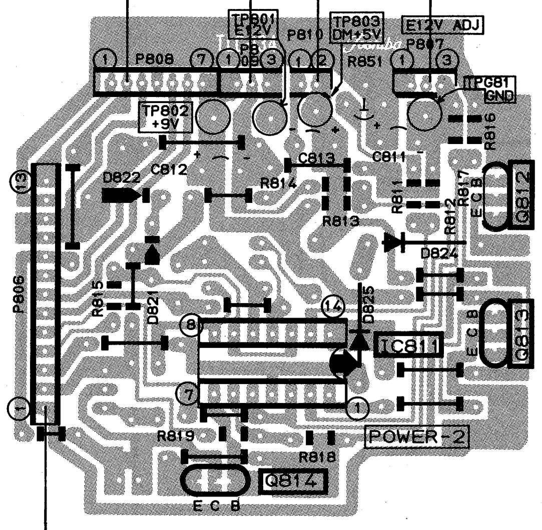
Symbol No.	Location
R851	C-10


F801 250V T2A
LINE FILTER
P802
P803
TP811
TP812
TP813
C802
BRN
BLU
L
N

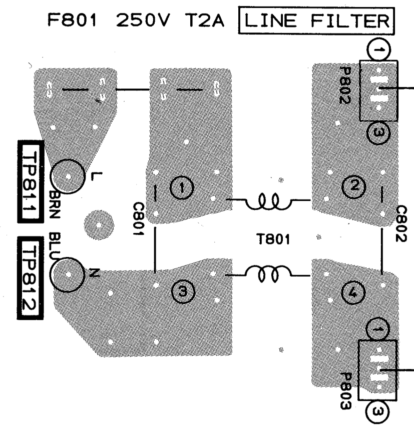
U804 Line Filter PC Board
(DV-90W)


F801 250V T2A
LINE FILTER
P802
P803
TP811
TP812
C802
BRN
BLU
L
N

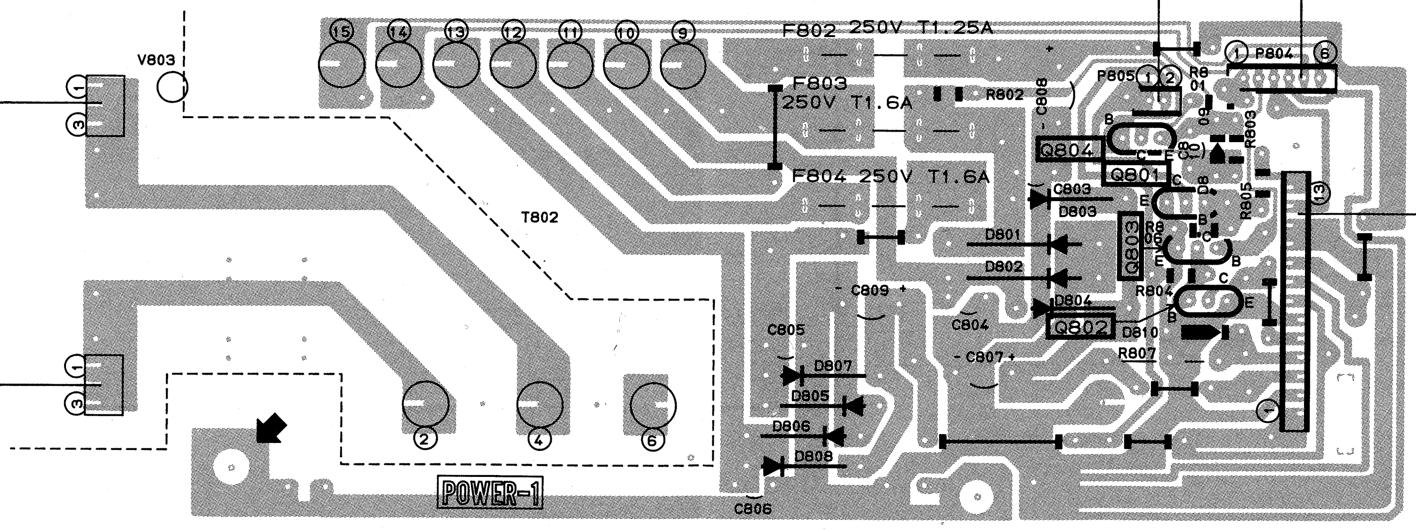
U804 Line Filter PC Board
(DV-90T)


Test Connector
P807
To UV01 Digital PC Board, PV01
P810
To UF02 Terminal PC Board, WF02
P809
To U202 Main PC Board, P603
P808
To U002 Timer 2 PC Board, PL63
P804
To RG01 Dew Heater
P805
TP801 E12V
TP803 DM+5V
E12V ADJ
R851
TP802 +9V
TP681 GND
D822
C812
C813
C811
R814
R813
R811
R812
R817
R816
Q812
D824
D825
D821
R815
P806
IC811
Q813
R819
R818
Q814
E C B
POWER-2

U803 Power 2 PC Board

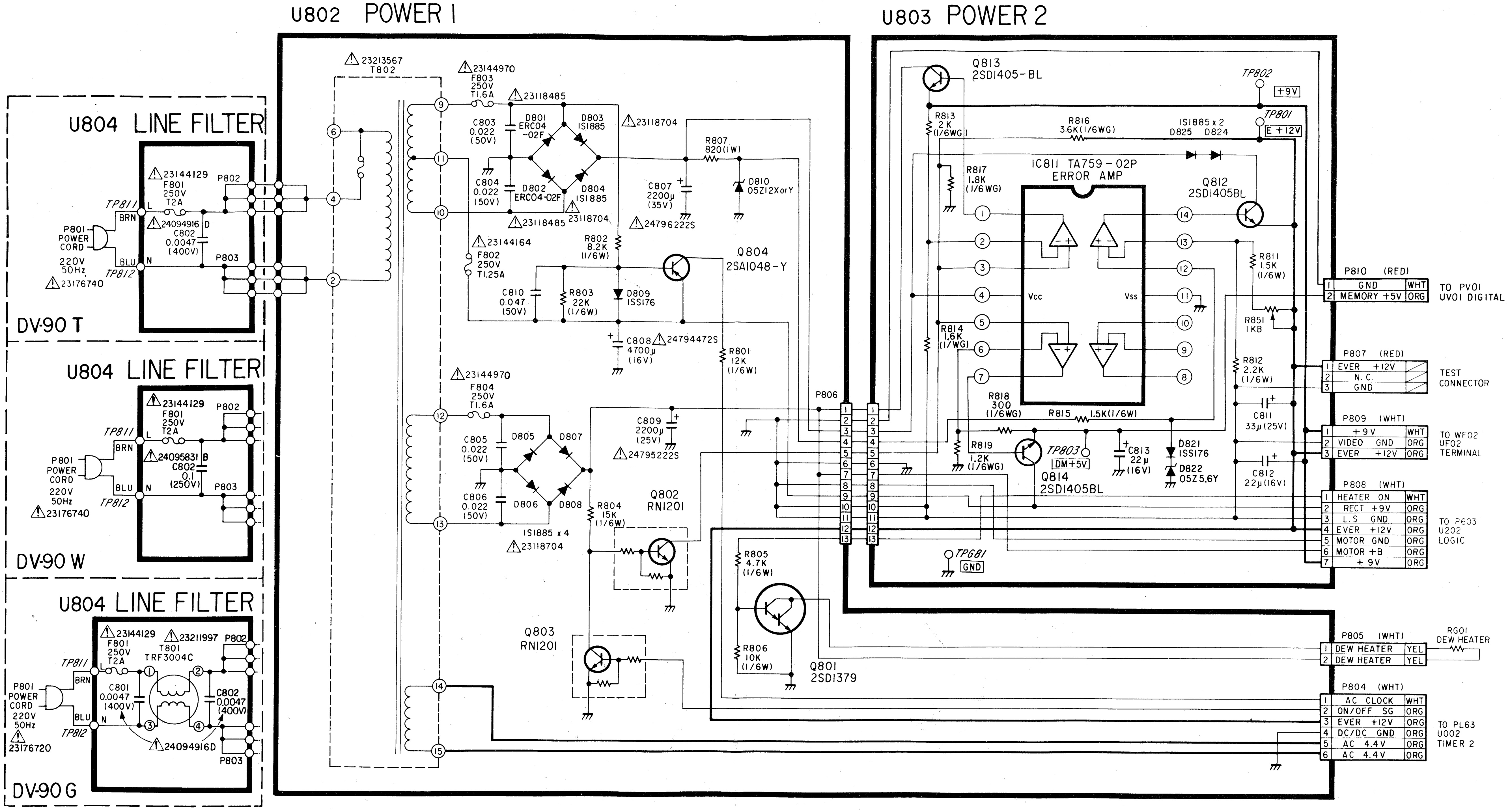

F801 250V T2A
LINE FILTER
P802
P803
TP811
TP812
C801
C802
T801
BRN
BLU
L
N

U804 Line Filter PC Board
(DV-90G)


P802
P803
V803
T802
F802 250V T1.25A
F803 250V T1.6A
F804 250V T1.6A
P805
P804
R802
C808
Q804
Q801
Q803
Q802
C803
D803
D801
D802
D804
D810
R804
R807
C809
C804
C807
C805
D807
D805
D806
D808
C806
POWER-1

U802 Power PC Board

7-3. Power Supply Circuit


U802 POWER 1
U803 POWER 2
U804 LINE FILTER
DV-90 T
DV-90 W
DV-90 G
P801 POWER CORD
220V 50Hz
TP811
TP812
BRN
BLU
L
N
F801 250V T2A
C802 0.0047 (400V)
C802 0.1 (250V)
C801 0.0047 (400V)
T801 TRF3004C
P802
P803
23144129
24094916 D
24095831 B
23211997
23176740
23176720
24094916D
T802
23213567
F803 250V T1.6A
23144970
23118485
D801 ERC04-02F
D802 ERC04-02F
D803 1S1885
D804 1S1885
C803 0.022 (50V)
C804 0.022 (50V)
23118704
R807 820(1W)
C807 2200μ (35V)
D810 05Z12XorY
24796222S
R802 8.2K (1/6W)
Q804 2SA1048-Y
F802 250V T1.25A
23144164
C810 0.047 (50V)
R803 22K (1/6W)
D809 1SS176
C808 4700μ (16V)
24794472S
R801 12K (1/6W)
F804 250V T1.6A
C805 0.022 (50V)
C806 0.022 (50V)
D805
D806
D807
D808
1S1885 x 4
C809 2200μ (25V)
24795222S
R804 15K (1/6W)
Q802 RN1201
Q803 RN1201
R805 4.7K (1/6W)
R806 10K (1/6W)
Q801 2SD1379
P806
Q813 2SD1405-BL
R813 2K (1/6WG)
R816 3.6K(1/6WG)
1S1885 x 2
D825 D824
TP802
+9V
TP801
E +12V
R817 1.8K (1/6WG)
IC811 TA759-02P
ERROR AMP
Vcc
Vss
Q812 2SD1405BL
R811 1.5K (1/6W)
R851 1KB
R812 2.2K (1/6W)
R814 1.6K (1/WG)
R818 300 (1/6WG)
R815 1.5K(1/6W)
R819 1.2K (1/6WG)
TP803
DM+5V
Q814 2SD1405BL
C813 22μ (16V)
D821 1SS176
D822 05Z5.6Y
C811 33μ(25V)
C812 22μ(16V)
TPG81
GND
P810 (RED)
GND WHT
MEMORY +5V ORG
TO PV01 UV01 DIGITAL
P807 (RED)
EVER +12V
N. C.
GND
TEST CONNECTOR
P809 (WHT)
+9V WHT
VIDEO GND ORG
EVER +12V ORG
TO WF02 UF02 TERMINAL
P808 (WHT)
HEATER ON WHT
RECT +9V ORG
L.S GND ORG
EVER +12V ORG
MOTOR GND ORG
MOTOR +B ORG
+ 9V ORG
TO P603 U202 LOGIC
P805 (WHT)
DEW HEATER YEL
DEW HEATER YEL
RG01 DEW HEATER
P804 (WHT)
AC CLOCK WHT
ON/OFF SG ORG
EVER +12V ORG
DC/DC GND ORG
AC 4.4V ORG
AC 4.4V ORG
TO PL63 U002 TIMER 2

(V)

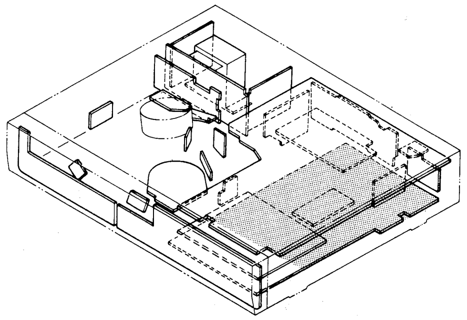
SYMBOL / TERMINAL / MODE	Q801			Q802			Q803			Q804			Q812			Q813			Q814		
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
S. BY	0	0.8	1.28	0	0	4.5	0	4.5	0	9.7	1.8	9.7	12.0	18.4	12.6	0	17.5	0	0	9.9	0
E. E.	0	0.8	1.28	0	4.0	0	0	0	2.0	9.2	1.8	9.2	12.0	18.0	12.6	9.0	16.5	9.6	5.0	8.8	5.6
PLAY	0	15.9	0	0	4.0	0	0	0	2.0	9.0	1.8	9.0	12.0	17.5	12.6	9.0	15.7	9.6	5.0	8.9	5.6
REC	0	15.4	0	0	4.0	0	0	0	2.0	9.0	1.8	9.0	12.0	17.5	12.6	9.0	15.5	9.6	5.0	8.7	5.6

IC811

(V)

TERMINAL / MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
S. BY	0	0	0	20.2	0	0	0	19.0	6.3	1.1	0	6.3	6.3	12.6
E.E.	9.6	4.0	4.0	19.6	4.0	4.0	5.6	18.3	6.3	1.1	0	6.3	6.3	12.6
PLAY	9.6	4.0	4.0	19.5	4.0	4.0	5.6	18.3	6.3	1.1	0	6.3	6.3	12.6
REC	9.6	4.0	4.0	19.4	4.0	4.0	5.6	18.1	6.3	1.1	0	6.3	6.3	12.6

8-2. PIF, Selector PC Board (DV-90T)



MODE	PIF ON			PIF OFF			Loca-tion
Symbol	TERMINAL (Unit:V)						
No.	E	C	B	E	C	B	
QA08	0	0	2.9	0	0	0	F-7
QA09	11.0	11.8	11.9	11.9	0	11.9	F-7

MODE	MUTE ON			MUTE OFF			Loca-tion
Symbol	TERMINAL (Unit:V)						
No.	E	C	B	E	C	B	
Q010	0	0.2	0	0	2.0	0	D-5
Q011	0	0	1.4	0	0	2.7	C-3

MODE	IC002 PIN 16: MORE THAN 3.6[V]			IC002 PIN 16: LESS THAN 3.6[V]			Loca-tion
Symbol	TERMINAL (Unit:V)						
No.	E	C	B	E	C	B	
Q003	3.6	0	4.4	0.9	0.6	0.4	E-3
Q004	0	5	0	0	0	0.6	E-3

Voltage and Location of Transistors

Symbol No.	Voltage (Unit:V)			Loca-tion
	E	C	B	
Q001	0.7	6.5	1.4	E-4
Q007	6.5	0.5	6.8	F-5
Q008	0	4.5	0.2	F-5
Q009	–	–	–	C-4
QA06	5.0(S)	2.2(D)	1.8(G)	E-6
QA07	0	17.9	0.6	E-6

Location of Diodes

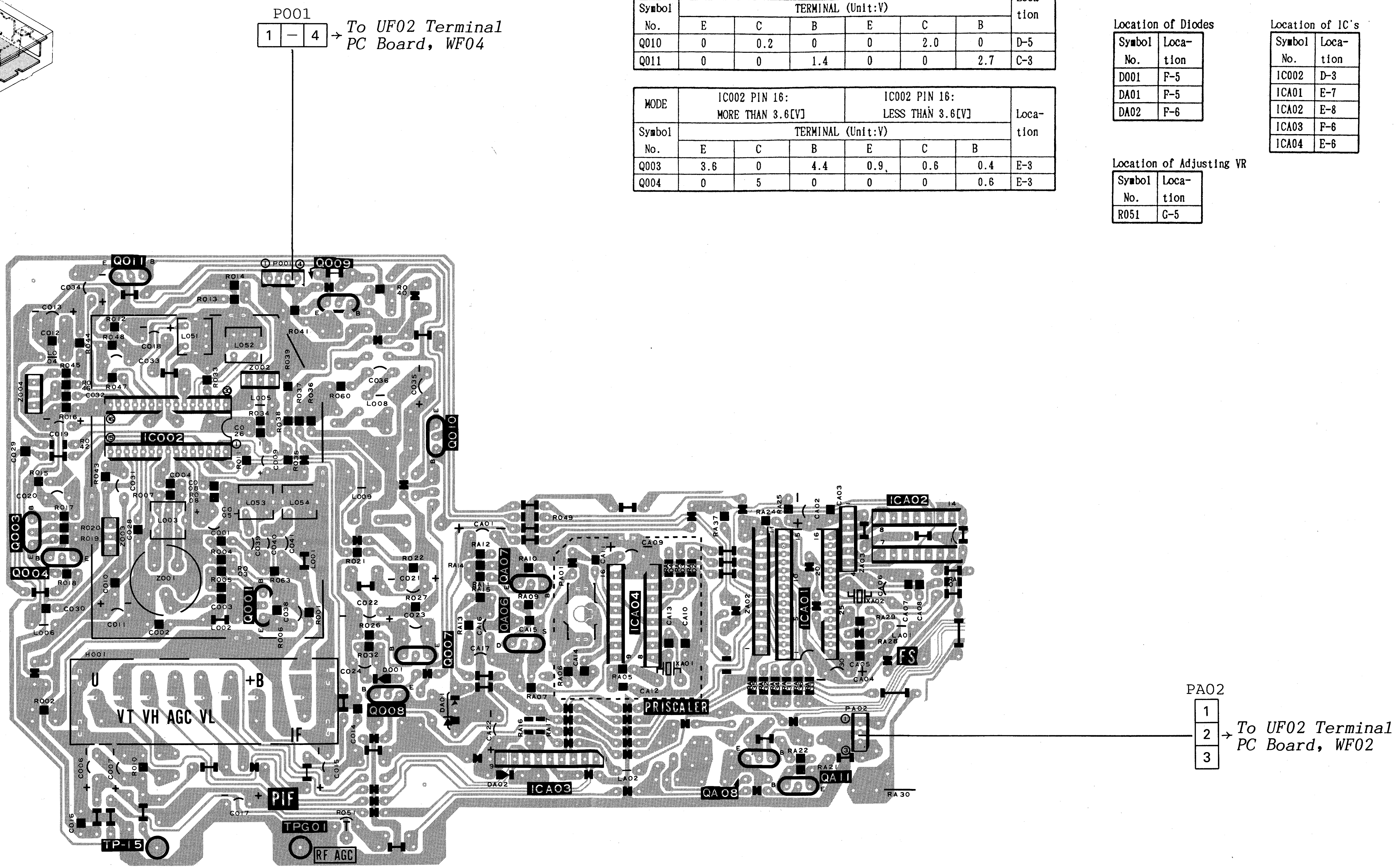
Symbol No.	Loca-tion
D001	F-5
DA01	F-5
DA02	F-6

Location of IC's

Symbol No.	Loca-tion
IC002	D-3
ICA01	E-7
ICA02	E-8
ICA03	F-6
ICA04	E-6

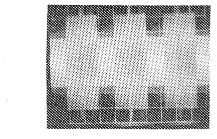
Location of Adjusting VR

Symbol No.	Loca-tion
R051	G-5

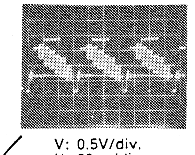

P001
1 – 4 → To UF02 Terminal PC Board, WF04
PA02
1
2 → To UF02 Terminal PC Board, WF02
3
Q011
Q009
IC002
Q010
Q003
Q004
Z001
Q001
Q007
Q008
QA07
QA06
ICA04
ICA01
ICA02
ICA03
QA08
QA11
PRISCALER
FS
U
+B
VT VH AGC VL
IF
PIF
TP-15
TPG01
RF AGC

U002 PIF PC Board

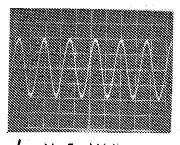
8-3. PIF, Selector Circuit (DV-90T)



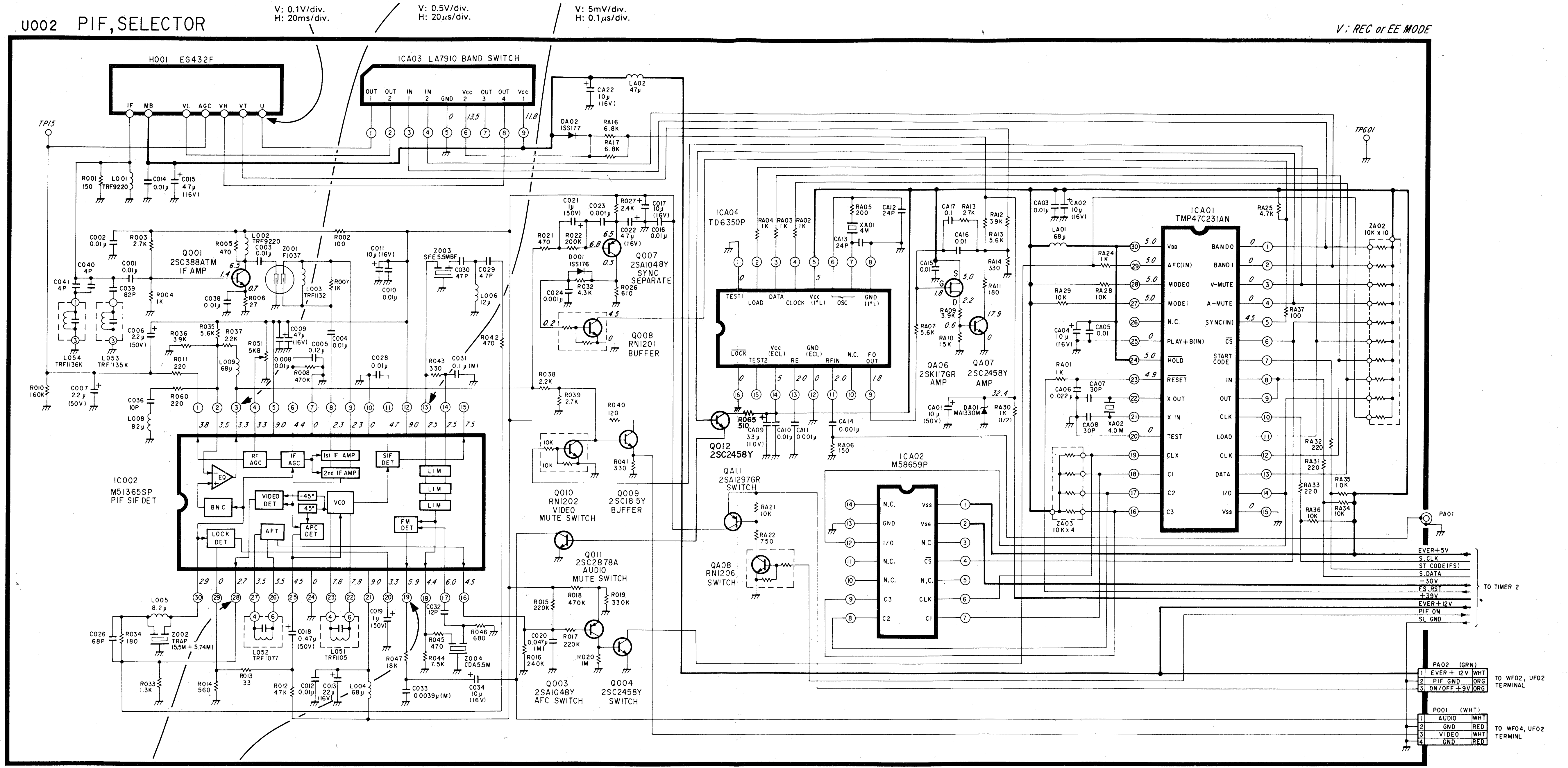
V: 0.1V/div.
H: 20ms/div.

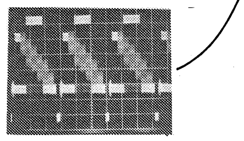


V: 0.5V/div.
H: 20μs/div.

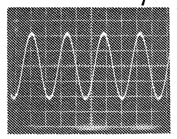


V: 5mV/div.
H: 0.1μs/div.


U002 PIF, SELECTOR
V: REC or EE MODE
H001 EG432F
IF MB VL AGC VH VT U
ICA03 LA7910 BAND SWITCH
OUT 1 OUT 2 IN 1 IN 2 GND Vcc 2 OUT 3 OUT 4 Vcc 1
TP15
TPG01
DA02 1SS177
RA16 6.8K
RA17 6.8K
CA22 10μ (16V)
LA02 47μ
R001 150
L001 TRF9220
C014 0.01μ
C015 47μ (16V)
Q001 2SC388ATM IF AMP
L002 TRF9220
Z001 F1037
L003 TRF1132
C041 4P
C040 4P
C039 82P
L054 TRF1136K
L053 TRF1135K
Z003 SFE5.5MBF
Q007 2SA1048Y SYNC SEPARATE
D001 1SS176
Q008 RN1201 BUFFER
IC002 M51365SP PIF·SIF DET
EQ
RF AGC
IF AGC
1st IF AMP
2nd IF AMP
SIF DET
LIM
BNC
VIDEO DET
-45°
45°
VCO
APC DET
AFT
LOCK DET
FM DET
L005 8.2μ
Z002 TRAP (5.5M+5.74M)
L052 TRF1077
L051 TRF1105
L004 68μ
Z004 CDA5.5M
Q010 RN1202 VIDEO MUTE SWITCH
Q009 2SC1815Y BUFFER
Q011 2SC2878A AUDIO MUTE SWITCH
Q003 2SA1048Y AFC SWITCH
Q004 2SC2458Y SWITCH
ICA04 TD6350P
TEST1 LOAD DATA CLOCK Vcc (1*L) OSC GND (1*L)
LOCK TEST2 Vcc (ECL) RE GND (ECL) RFIN N.C. FO OUT
XA01 4M
Q012 2SC2458Y
QA11 2SA1297GR SWITCH
QA08 RN1206 SWITCH
QA06 2SK117GR AMP
QA07 2SC2458Y AMP
DA01 MA1330M
ICA02 M58659P
N.C. GND I/O N.C. N.C. C3 C2 Vss Vcc N.C. CS N.C. CLK CI
ICA01 TMP47C231AN
Vdd AFC(IN) MODE0 MODE1 N.C. PLAY+B(IN) HOLD RESET X OUT X IN TEST CLX C1 C2 C3
BAND0 BAND1 V-MUTE A-MUTE SYNC(IN) CS START CODE IN OUT CLK LOAD CLK DATA I/O Vss
XA02 4.0M
ZA02 10K x 10
ZA03 10K x 4
PA01
EVER+5V
S.CLK
ST CODE(FS)
S.DATA
-30V
FS RST
+39V
EVER+12V
PIF ON
SL GND
TO TIMER 2
PA02 (GRN)
1 EVER+12V WHT
2 PIF GND ORG
3 ON/OFF+9V ORG
TO WF02, UF02 TERMINAL
P001 (WHT)
1 AUDIO WHT
2 GND RED
3 VIDEO WHT
4 GND RED
TO WF04, UF02 TERMINL



V: 0.2V/div.
H: 20μs/div.



V: 0.5V/div.
H: 1ms/div

AFC DETECT (V)

SYMBOL	Q003			Q004		
MODE \ TERMINAL	E	C	B	E	C	B
IC002 PIN16 MORE THAN 3.6 (V)	3.6	0	4.4	0	5	0
Q002 PIN16 LESS THAN 3.6 (V)	0.9	0.6	0.4	0	0	0.6

VIDEO AUDIO MUTE (V)

SYMBOL	Q010			Q011		
MODE \ TERMINAL	E	C	B	E	C	B
MUTE OFF	0	2.0	0	0	0	2.7
MUTE ON	0	0.2	0	0	0	1.4

BAND SWITCH (V)

MODE \ TERMINAL	ICA01 PIN 2 (ICA03 PIN 3)	ICA01 PIN 2 (ICA03 PIN 4)	ICA03·PIN 2	ICA03 PIN 8	ICA03 PIN 1
VL	H(1.9)	L(0)	12.0	0	0
VH	H(1.9)	H(1.9)	0	12.0	0
U	L(0)	L(0)	0	0	12.0

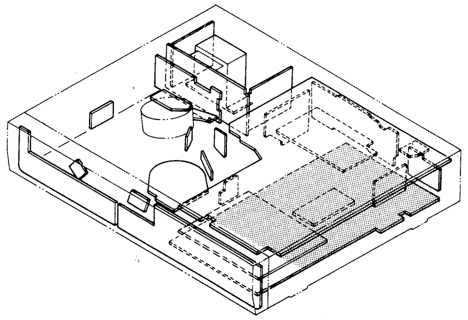
PIF ON/OFF (V)

SYMBOL	QA08			QA11		
MODE \ TERMINAL	E	C	B	E	C	B
PIF ON	0	0	2.9	9.0	9.0	8.3
PIF OFF	0	0	0	0	0	0

VIDEO AUDIO MUTE (V)

SYMBOL	ICA01	
MODE \ TERMINAL	PIN3 (VIDEO MUTE)	PIN4 (AUDIO MUTE)
MUTE OFF	L(0)	L(0)
MUTE ON	H(2.7)	H(2.2)

8-4. PIF, Selector PC Board (DV-90G)



MODE	PIF ON			PIF OFF			Loca-tion
Symbol	TERMINAL (Unit:V)						
No.	E	C	B	E	C	B	
QA08	0	0	2.9	0	0	0	F-7
QA11	9.0	9.0	8.3	0	0	0	F-7

MODE	MUTE ON			MUTE OFF			Loca-tion
Symbol	TERMINAL (Unit:V)						
No.	E	C	B	E	C	B	
Q010	0	0.2	0	0	2.0	0	D-5
Q011	0	0	1.4	0	0	2.7	C-3

MODE	IC002 PIN 16: MORE THAN 3.6[V]			IC002 PIN 16: LESS THAN 3.6[V]			Loca-tion
Symbol	TERMINAL (Unit:V)						
No.	E	C	B	E	C	B	
Q003	3.6	0	4.4	0.9	0.6	0.4	E-2
Q004	0	5	0	0	0	0.6	E-2

Voltage and Location of Transistors

Symbol No.	Voltage (Unit:V)			Loca-tion
	E	C	B	
Q001	0.7	6.5	1.4	E-4
Q007	6.6	0.5	6.6	F-5
Q008	0	4.5	0.2	F-5
Q009	–	–	–	C-4
QA06	5.0(S)	2.2(D)	1.8(G)	E-5
QA07	0	17.9	0.6	E-5

Location of Diodes

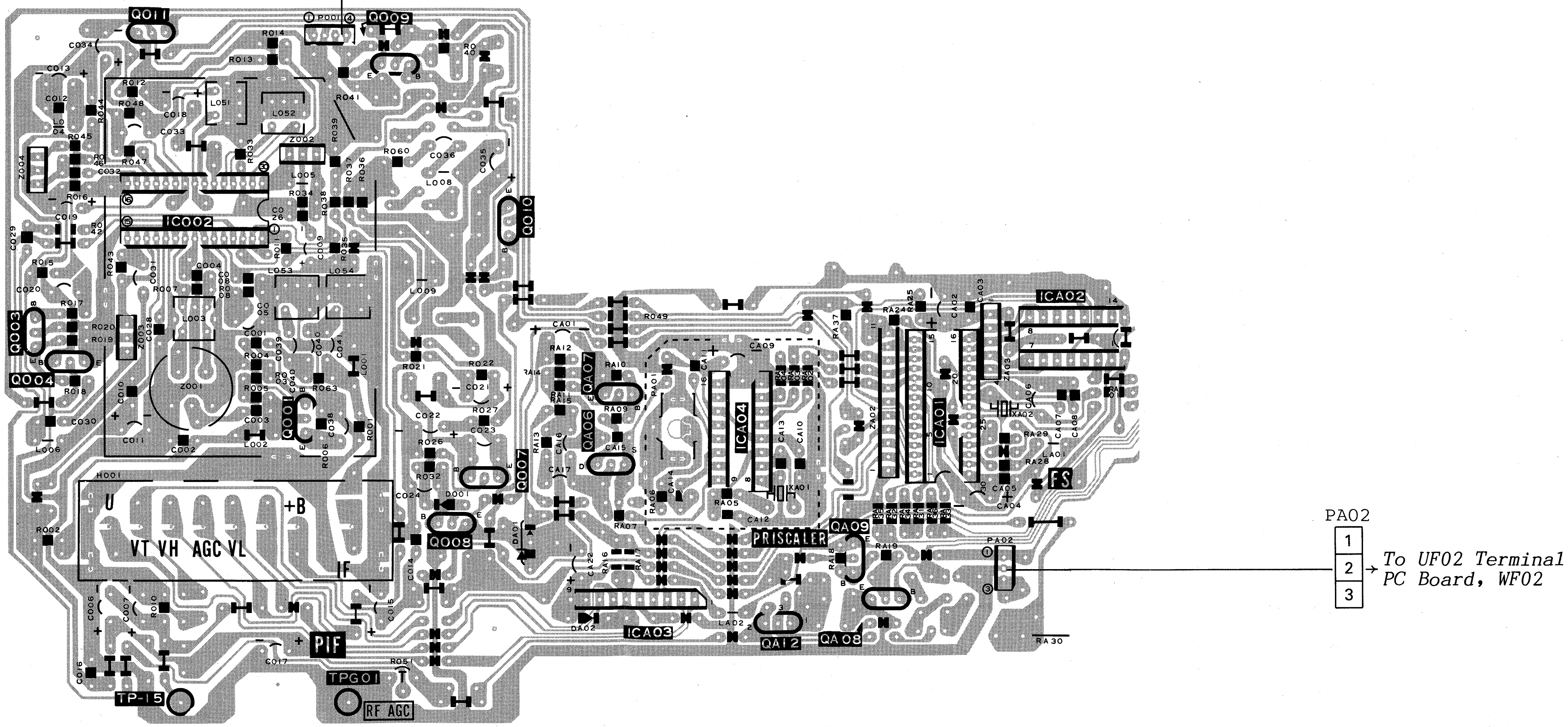
Symbol No.	Loca-tion
D001	F-4
DA01	F-5
DA02	F-5

Location of Adjusting VR

Symbol No.	Loca-tion
R051	G-4

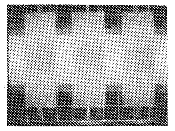
Location of IC's

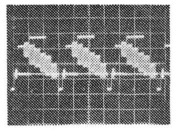
Symbol No.	Loca-tion
IC002	D-3
ICA01	E-7
ICA02	E-8
ICA03	F-6
ICA04	E-6

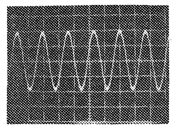

1 2 3 4 5 6 7 8 9 10 11
A B C D E F G
P001
1 – 4
→ To UF02 Terminal PC Board, WF04
PA02
1
2
3
→ To UF02 Terminal PC Board, WF02
Q011
Q009
Q010
IC002
Q003
Q004
Q001
Q007
Q008
QA06
QA07
QA09
QA12
QA08
ICA01
ICA02
ICA03
ICA04
PRISCALER
FS
PIF
TPG01
RF AGC
TP-15
H001
U
+B
VT VH AGC VL
IF
Z001
Z002
Z003
Z004
L001
L002
L003
L005
L008
L009
L051
L052
L053
L054
D001
DA01
DA02
R051

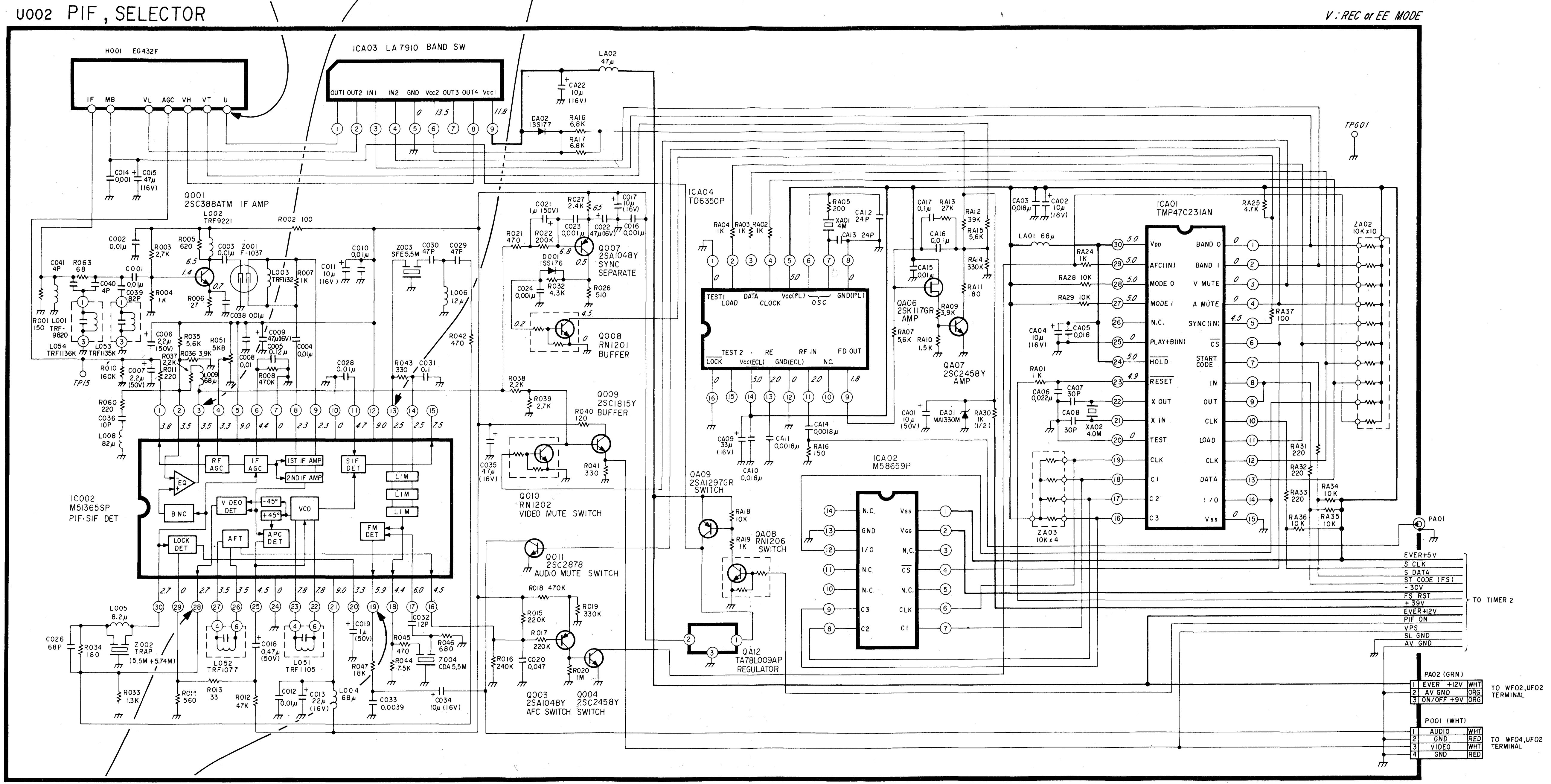
U002 PIF PC Board

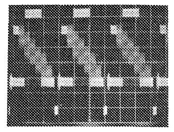
8-5. PIF, Selector Circuit (DV-90G)

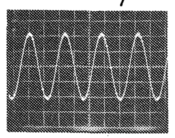

V: 0.1V/div.
H: 20ms/div.


V: 0.5V/div.
H: 20μs/div.


V: 5mV/div.
H: 0.1μs/div.


U002 PIF, SELECTOR
V: REC or EE MODE
H001 EG432F
IF MB VL AGC VH VT U
ICA03 LA7910 BAND SW
OUT1 OUT2 IN1 IN2 GND Vcc2 OUT3 OUT4 Vcc1
LA02 47μ
CA22 10μ (16V)
DA02 1SS177
RA16 6.8K
RA17 6.8K
Q001 2SC388ATM IF AMP
L002 TRF9221
R002 100
Z001 F-1037
Z003 SFE5.5M
Q007 2SA1048Y SYNC SEPARATE
Q008 RN1201 BUFFER
Q009 2SC1815Y BUFFER
Q010 RN1202 VIDEO MUTE SWITCH
Q011 2SC2878 AUDIO MUTE SWITCH
Q003 2SA1048Y AFC SWITCH
Q004 2SC2458Y SWITCH
IC002 M51365SP PIF-SIF DET
EQ
RF AGC
IF AGC
1ST IF AMP
2ND IF AMP
SIF DET
LIM
BNC
VIDEO DET
-45°
+45°
VCO
APC DET
AFT
LOCK DET
FM DET
L052 TRF1077
L051 TRF1105
Z002 TRAP (5.5M+5.74M)
Z004 CDA5.5M
TP15
ICA04 TD6350P
TEST1 LOAD DATA CLOCK Vcc(PL) OSC GND(PL)
TEST 2 RE RF IN FD OUT
LOCK Vcc(ECL) GND(ECL) N.C.
XA01 4M
QA06 2SK117GR AMP
QA07 2SC2458Y AMP
DA01 MA1330M
QA09 2SA1297GR SWITCH
QA08 RN1206 SWITCH
QA12 TA78L009AP REGULATOR
ICA02 M58659P
N.C. GND I/O N.C. N.C. C1 C2
Vss Vdd N.C. CS N.C. CLK C1
ICA01 TMP47C231AN
VDD AFC(IN) MODE 0 MODE 1 N.C. PLAY+B(IN) HOLD RESET X OUT X IN TEST CLK C1 C2 C3
BAND 0 BAND 1 V MUTE A MUTE SYNC(IN) CS START CODE IN OUT CLK LOAD CLK DATA I/O Vss
XA02 4.0M
ZA02 10K x10
ZA03 10K x 4
TPG01
PA01
EVER+5V
S CLK
S DATA
ST CODE (FS)
-30V
FS RST
+39V
EVER+12V
PIF ON
VPS
SL GND
AV GND
TO TIMER 2
PA02 (GRN)
1 EVER +12V WHT
2 AV GND ORG
3 ON/OFF +9V ORG
TO WF02,UF02 TERMINAL
P001 (WHT)
1 AUDIO WHT
2 GND RED
3 VIDEO WHT
4 GND RED
TO WF04,UF02 TERMINAL


V: 0.2V/div.
H: 20μs/div.


V: 0.5V/div.
H: 1ms/div.

AFC DETECT (V)

SYMBOL	Q003			Q004		
MODE \ TERMINAL	E	C	B	E	C	B
IC002 PIN 16 MORE THAN 3.6(V)	3.6	0	4.4	0	5	0
Q002 PIN 16 LESS THAN 3.6(V)	0.9	0.6	0.4	0	0	0.6

VIDEO·AUDIO MUTE (V)

SYNBOL	Q010			Q011		
MODE \ TERMINAL	E	C	B	E	C	B
MUTE OFF	0	2.0	0	0	0	2.7
MUTE ON	0	0.2	0	0	0	1.4

BAND SWITCH (V)

MODE \ TERMINAL	ICA01 PIN 1 (ICA03 PIN 3)	ICA01 PIN 2 (ICA03 PIN 4)	ICA03 PIN 2	ICA03 PIN 8	ICA03 PIN 1
VL	H (1.9)	L (0)	12.0	0	0
VH	H (1.9)	H (1.9)	0	12.0	0
U	L (0)	L (0)	0	0	12.0

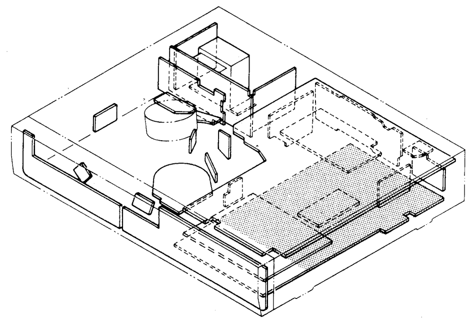
PIF ON/OFF (V)

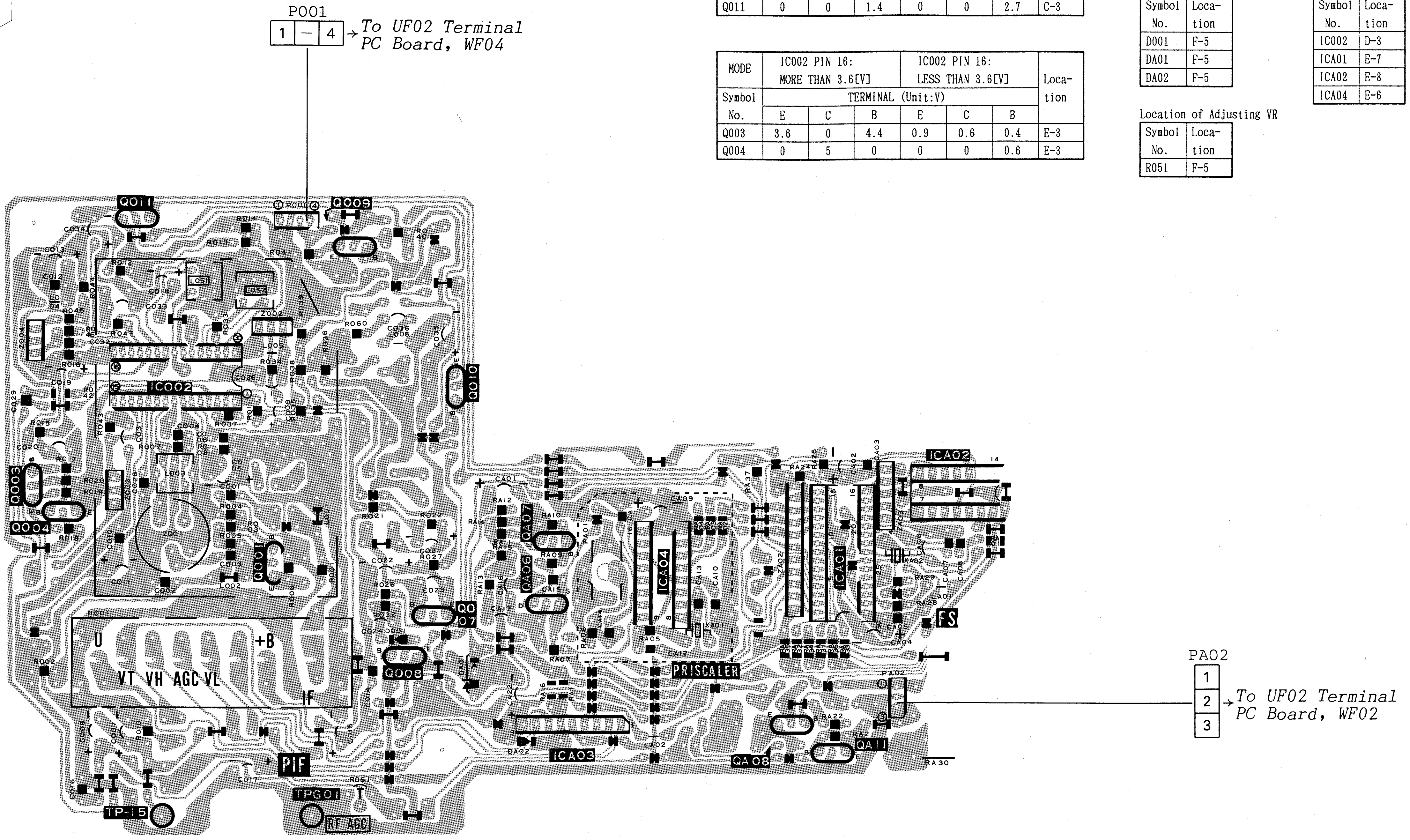
SYNBOL	QA08			QA09			QA12		
MODE \ TERMINAL	E	C	B	E	C	B	1	2	3
PIF ON	0	0	2.9	11.0	11.8	11.9	11.9	8.9	0
PIF OFF	0	11.9	0	11.9	0	11.9	0	0	0

VIDEO·AUDIO MUTE (V)

SYNBOL	ICA01	
MODE \ TERMINAL	PIN 3 (VIDEO MUTE)	PIN 4 (AUDIO MUTE)
MUTE OFF	L (0)	L (0)
MUTE ON	H (2.7)	H (2.2)

8-6. PIF, Selector PC Board (DV-90W)




P001
1 – 4
To UF02 Terminal PC Board, WF04
PA02
1
2
3
To UF02 Terminal PC Board, WF02
Q011
Q009
Q010
Q003
Q004
Q001
Q007
Q008
QA06
QA07
QA08
QA11
IC002
ICA01
ICA02
ICA03
ICA04
Z001
H001
U
+B
VT VH AGC VL
IF
PIF
TPG01
RF AGC
TP-15
PRISCALER
FS

MODE	PIF ON			PIF OFF			Loca-tion
Symbol No.	TERMINAL (Unit:V)						
	E	C	B	E	C	B	
QA08	0	0	2.9	0	0	0	F-7
QA11	9.0	9.0	8.3	0	0	0	F-8

MODE	MUTE ON			MUTE OFF			Loca-tion
Symbol No.	TERMINAL (Unit:V)						
	E	C	B	E	C	B	
Q010	0	0.2	0	0	2.0	0	D-5
Q011	0	0	1.4	0	0	2.7	C-3

MODE	IC002 PIN 16: MORE THAN 3.6[V]			IC002 PIN 16: LESS THAN 3.6[V]			Loca-tion
Symbol No.	TERMINAL (Unit:V)						
	E	C	B	E	C	B	
Q003	3.6	0	4.4	0.9	0.6	0.4	E-3
Q004	0	5	0	0	0	0.6	E-3

Voltage and Location of Transistors

Symbol No.	Voltage (Unit:V)			Loca-tion
	E	C	B	
Q001	0.7	6.5	1.4	E-4
Q007	6.6	0.5	6.6	E-5
Q008	0	4.5	0.2	F-5
Q009	–	–	–	C-4
QA06	5.0(S)	2.2(D)	1.8(G)	E-6
QA07	0	17.9	0.6	E-6

Location of Diodes

Symbol No.	Loca-tion
D001	F-5
DA01	F-5
DA02	F-5

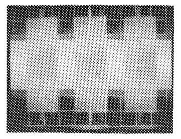
Location of IC's

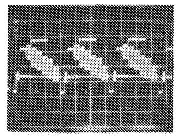
Symbol No.	Loca-tion
IC002	D-3
ICA01	E-7
ICA02	E-8
ICA04	E-6

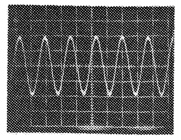
Location of Adjusting VR

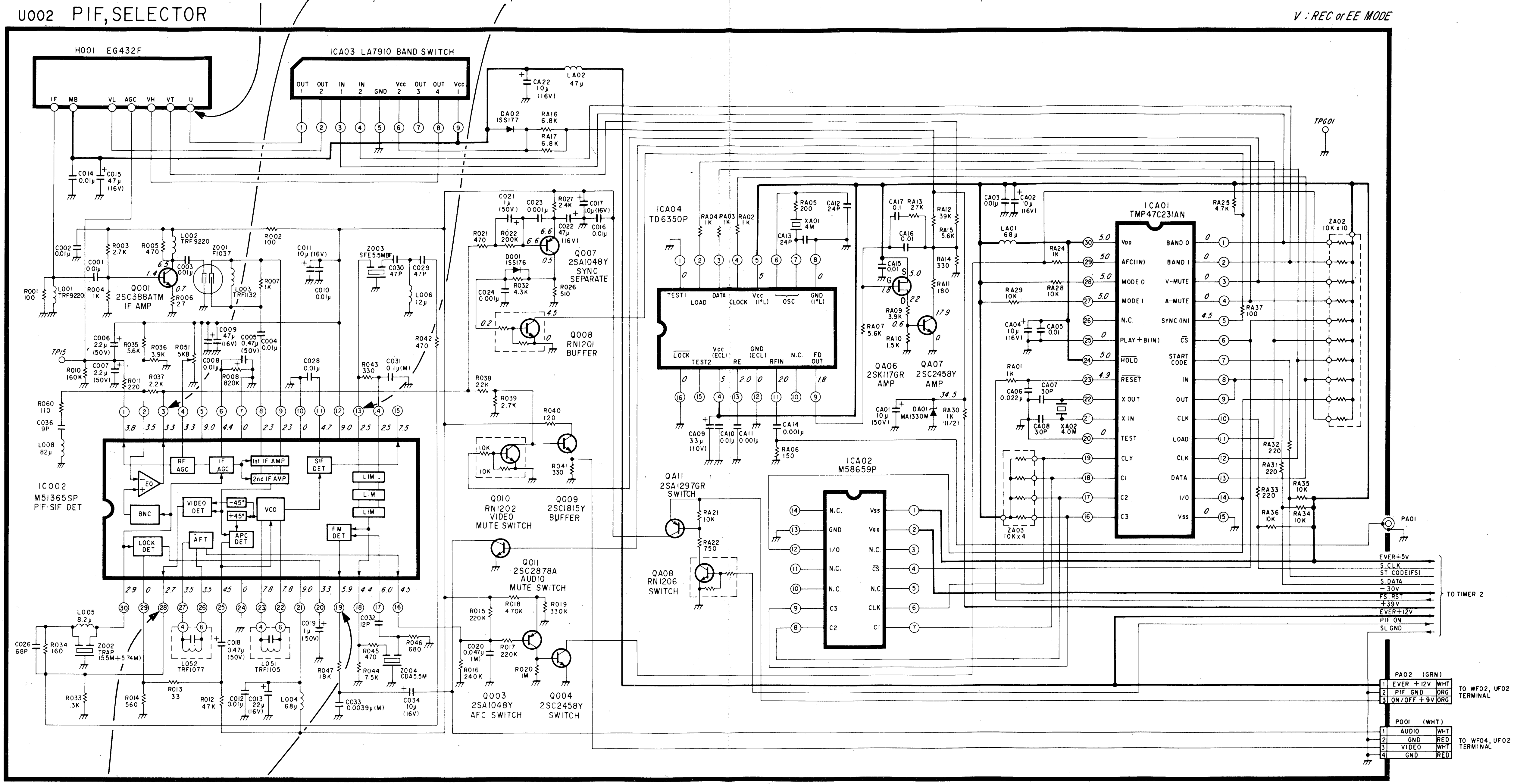
Symbol No.	Loca-tion
R051	F-5

8-7. PIF, Selector Circuit (DV-90W)


V: 0.1V/div.
H: 20ms/div.


V: 0.5V/div.
H: 20μs/div.


V: 5mV/div.
H: 0.1μs/div.


U002 PIF, SELECTOR
V : REC or EE MODE
H001 EG432F
IF MB VL AGC VH VT U
ICA03 LA7910 BAND SWITCH
OUT 1 OUT 2 IN 1 IN 2 GND VCC 2 OUT 3 OUT 4 VCC 1
DA02 1SS177
RA16 6.8K
RA17 6.8K
CA22 10μ (16V)
LA02 47μ
C014 0.01μ
C015 47μ (16V)
Q001 2SC388ATM IF AMP
L002 TRF9220
Z001 F1037
L003 TRF1132
Z003 SFE5.5MB
L001 TRF9220
Q007 2SA1048Y SYNC SEPARATE
Q008 RN1201 BUFFER
D001 1SS176
IC002 M51365SP PIF·SIF DET
RF AGC
IF AGC
1st IF AMP
2nd IF AMP
SIF DET
EQ
BNC
VIDEO DET
-45°
+45°
VCO
LIM
APC DET
AFT
LOCK DET
FM DET
L052 TRF1077
L051 TRF1105
Z002 TRAP (5.5M+5.74M)
Z004 CDA5.5M
Q010 RN1202 VIDEO MUTE SWITCH
Q009 2SC1815Y BUFFER
Q011 2SC2878A AUDIO MUTE SWITCH
Q003 2SA1048Y AFC SWITCH
Q004 2SC2458Y SWITCH
ICA04 TD6350P
TEST1 LOAD DATA CLOCK VCC (I²L) OSC GND (I²L)
LOCK TEST2 VCC (ECL) RE GND (ECL) RFIN N.C. FD OUT
QA06 2SK117GR AMP
QA07 2SC2458Y AMP
DA01 MA1330M
QA11 2SA1297GR SWITCH
QA08 RN1206 SWITCH
ICA02 M58659P
N.C. GND I/O N.C. N.C. C3 C2 VSS VGG N.C. CS N.C. CLK CI
ICA01 TMP47C231AN
VDD AFC(IN) MODE 0 MODE 1 N.C. PLAY+B(IN) HOLD RESET X OUT X IN TEST CLX C1 C2 C3
BAND 0 BAND 1 V-MUTE A-MUTE SYNC (IN) CS START CODE IN OUT CLK LOAD CLK DATA I/O VSS
X401 4M
XA02 4.0M
ZA02 10K x 10
ZA03 10K x 4
TPG01
PA01
EVER+5V
S.CLK
ST CODE(FS)
S.DATA
-30V
FS.RST
+39V
EVER+12V
PIF ON
SL GND
TO TIMER 2
PA02 (GRN)
1 EVER +12V WHT
2 PIF GND ORG
3 ON/OFF +9V ORG
TO WF02, UF02 TERMINAL
P001 (WHT)
1 AUDIO WHT
2 GND RED
3 VIDEO WHT
4 GND RED
TO WF04, UF02 TERMINAL

AFC DETECT (V)

SYMBOL	Q003			Q004		
MODE \ TERMINAL	E	C	B	E	C	B
IC002 PIN16 MORE THAN 3.6(V)	3.6	0	4.4	0	5	0
Q002 PIN16 LESS THAN 3.6(V)	0.9	0.6	0.4	0	0	0.6

VIDEO·AUDIO MUTE (V)

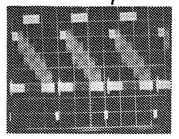
SYMBOL	Q010			Q011		
MODE \ TERMINAL	E	C	B	E	C	B
MUTE OFF	0	2.0	0	0	0	2.7
MUTE ON	0	0.2	0	0	0	1.4

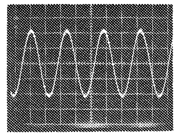
PIF ON / OFF (V)

SYMBOL	QA08			QA11		
MODE \ TERMINAL	E	C	B	E	C	B
PIF ON	0	0	2.9	9.0	9.0	8.3
PIF OFF	0	0	0	0	0	0

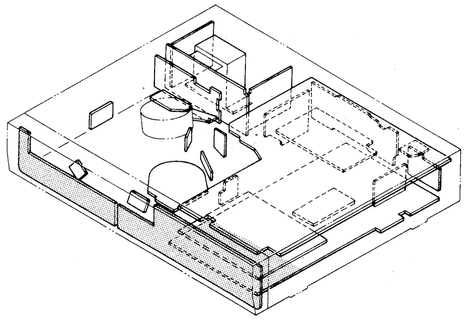
VIDEO AUDIO MUTE (V)

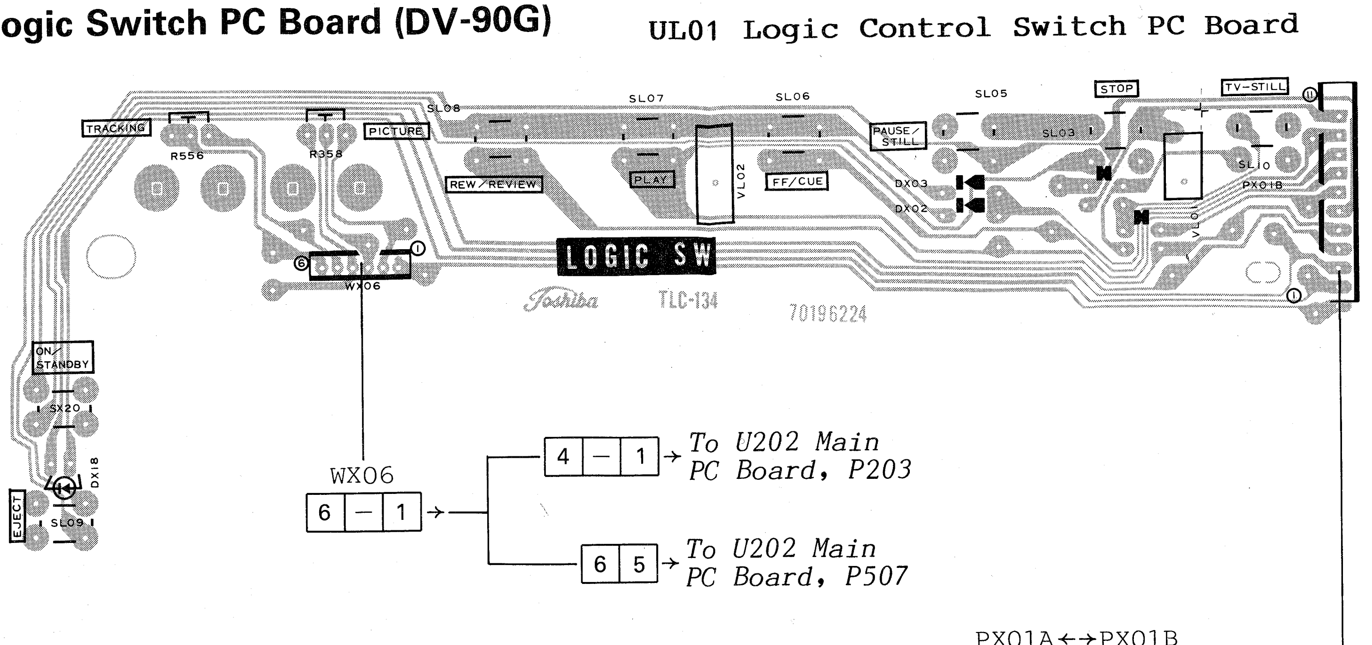
SYMBOL	ICA01	
MODE \ TERMINAL	PIN3 (VIDEO MUTE)	PIN 4 (AUDIO MUTE)
MUTE OFF	L(0)	L(0)
MUTE ON	H(2.7)	H(2.2)


V: 0.2V/div.
H: 20μs/div.


V: 0.5V/div.
H: 1ms/div.

9-3. Timer, Display, Timer 2, VPS, Logic Switch PC Board (DV-90G)




UL01 Logic Control Switch PC Board
TRACKING
R556
R358
PICTURE
SL08
SL07
SL06
SL05
STOP
TV-STILL
PAUSE/STILL
SL03
REW/REVIEW
PLAY
VL02
FF/CUE
DX03
DX02
SL10
PX01B
VL01
LOGIC SW
Toshiba
TLC-134
70196224
WX06
ON/STANDBY
SX20
DX18
EJECT
SL09
WX06
6 — 1
4 — 1
To U202 Main PC Board, P203
6 5
To U202 Main PC Board, P507

Voltage and Location of Transistors V : REC MODE (V): PLAY MODE

Symbol No.	Voltage (Unit:V)			Location
	E	C	B	
QL60	—	2.0(2.0)	0(0)	F-4
QL61	—	2.7(0)	0(0)	F-4
QL62	0(0)	2.7(0)	1.3(5.0)	F-3
QX02	(2.5)	(5.1)	(2.8)	E-7
QX61	0	0(5.1)	2.8(0)	F-3
QX63	5.0(5.0)	5.0(0)	4.3(5.0)	F-3

Location of IC's

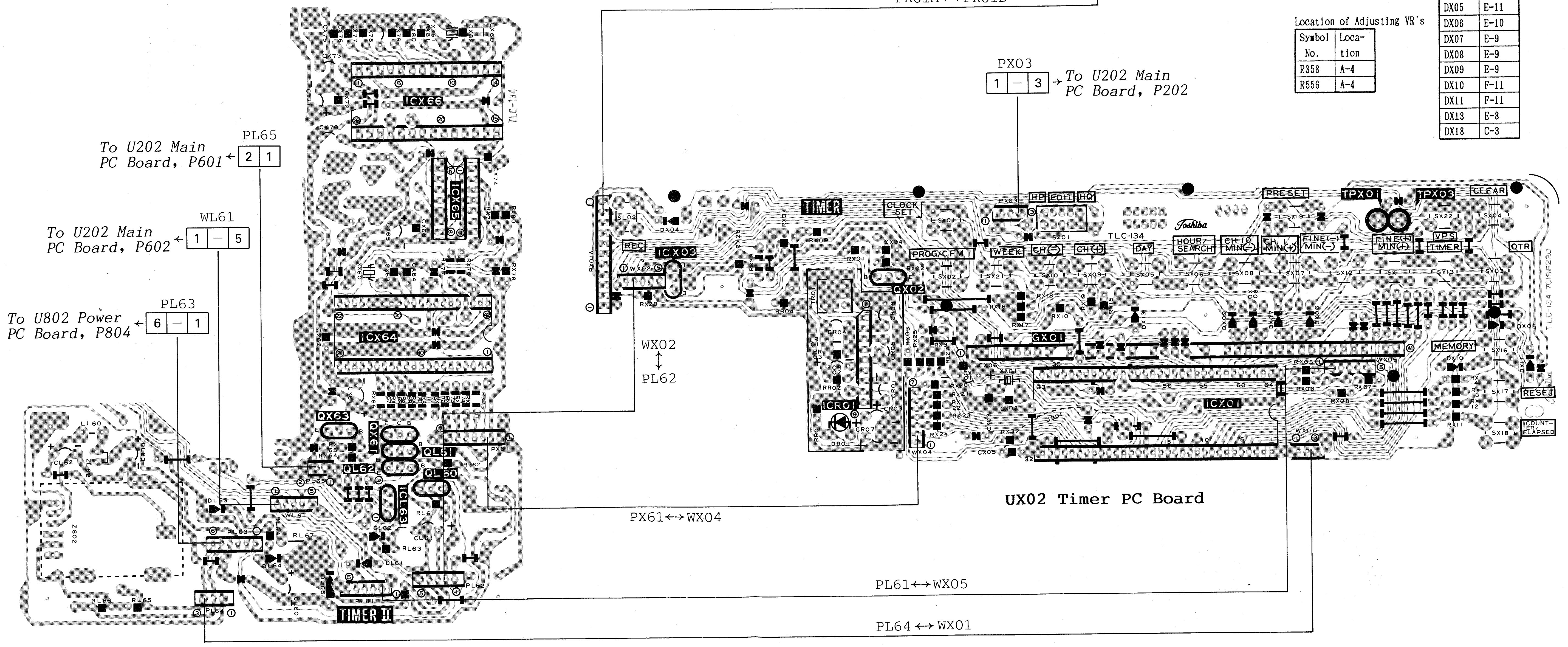
Symbol No.	Location
ICL63	F-3
ICR01	F-6
ICX01	F-9
ICX03	E-5
ICX64	E-3
ICX65	D-4
ICX66	D-4

Location of Adjusting VR's

Symbol No.	Location
R358	A-4
R556	A-4

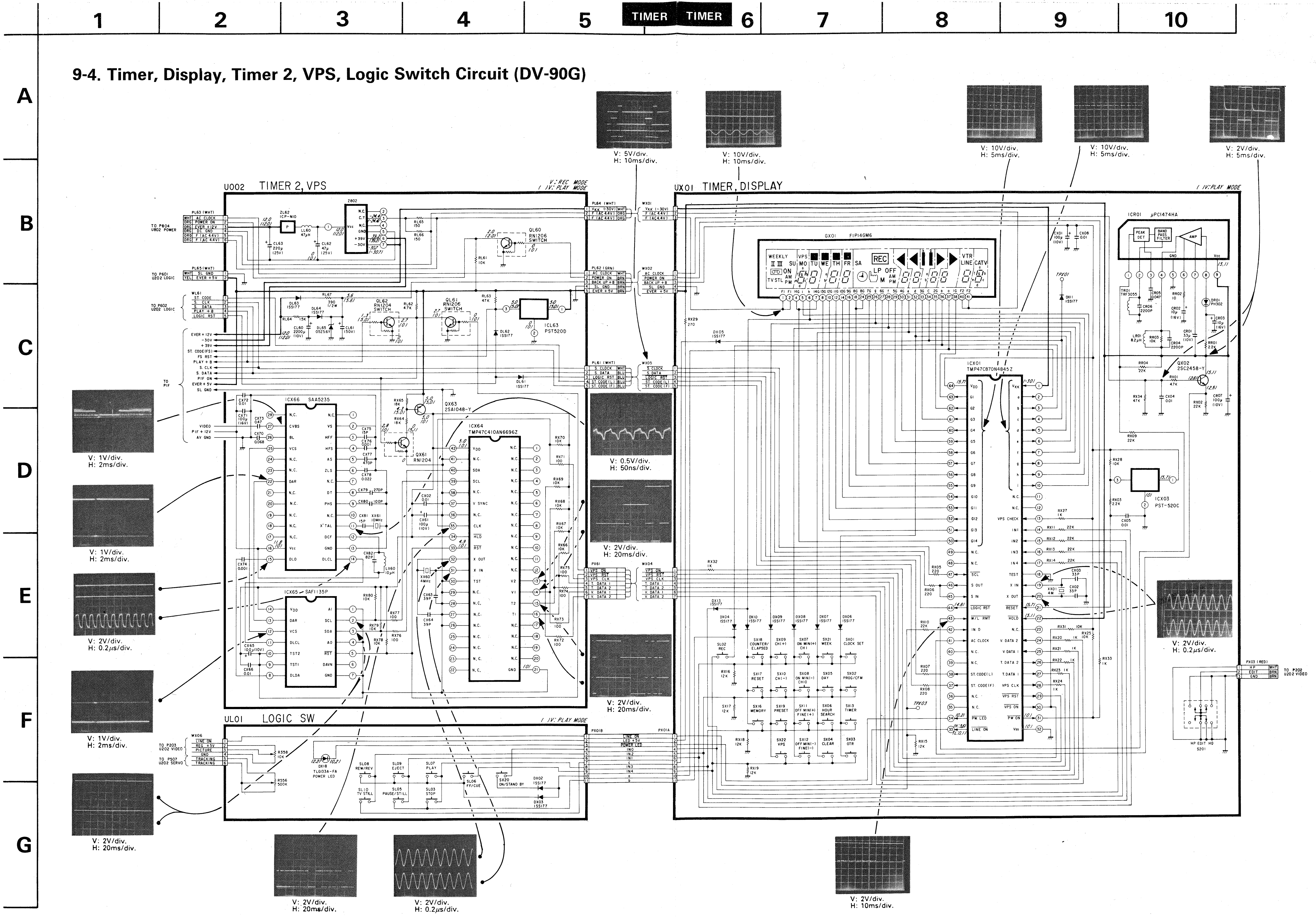
Location of Diodes

Symbol No.	Location
DL61	G-3
DL62	G-3
DL63	F-2
DL64	G-2
DL65	G-3
DR01	F-6
DX02	B-7
DX03	A-7
DX04	E-5
DX05	E-11
DX06	E-10
DX07	E-9
DX08	E-9
DX09	E-9
DX10	F-11
DX11	F-11
DX13	E-8
DX18	C-3

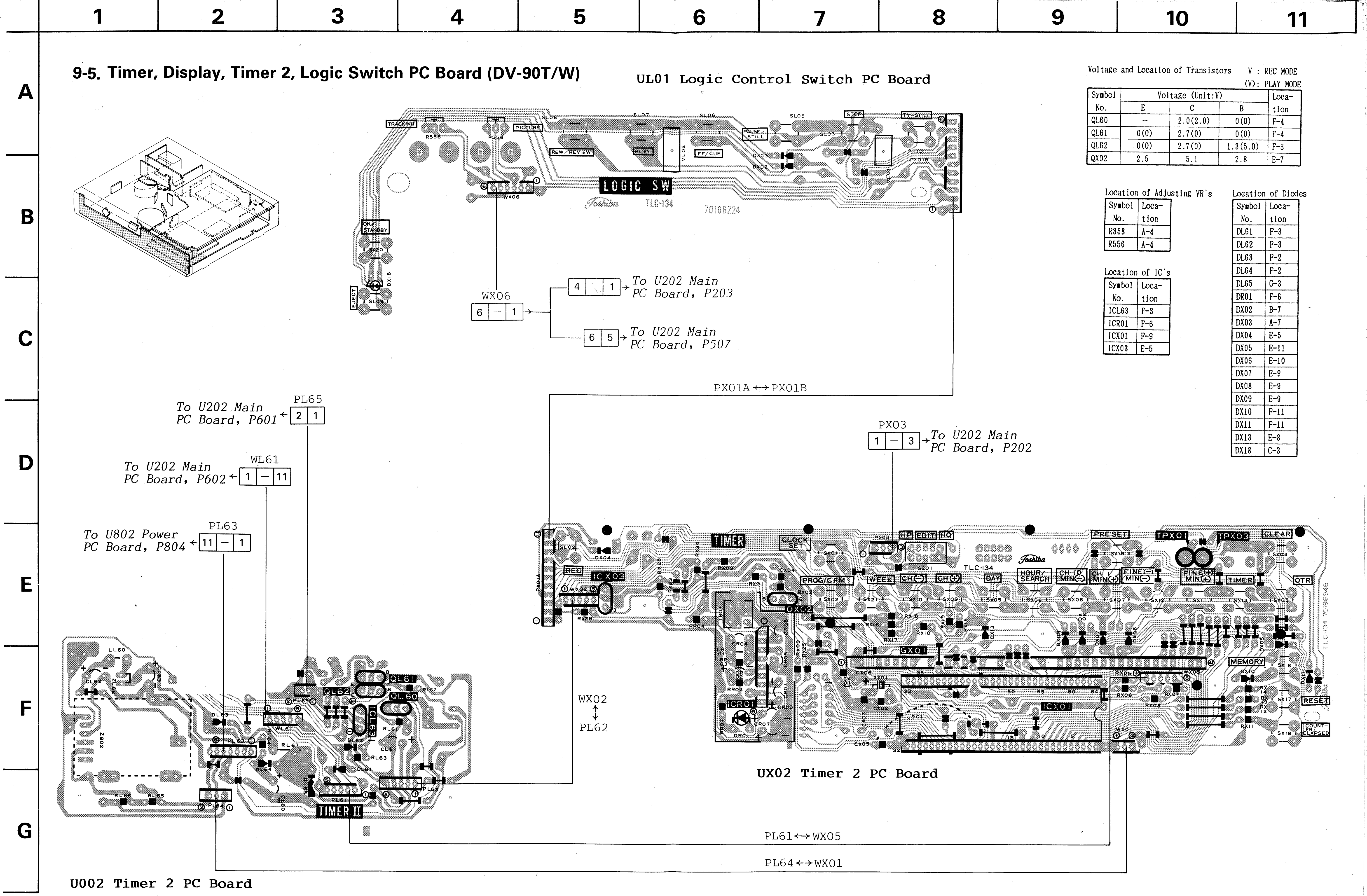

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
PX01A ↔ PX01B
PX03
1 — 3
To U202 Main PC Board, P202
PL65
2 1
To U202 Main PC Board, P601
WL61
1 — 5
To U202 Main PC Board, P602
PL63
6 — 1
To U802 Power PC Board, P804
ICX66
ICX65
ICX64
TLC-134
WX02 ↕ PL62
QX63
QX61
QL61
QL62
QL60
ICL63
PX61
PL65
WL61
PL63
DL63
DL64
DL65
DL61
DL62
RL67
RL63
RL66
RL65
PL64
PL61
PL62
LL60
CL62
CL63
CL60
CL61
Z802
TIMER II
TIMER
CLOCK SET
HP
EDIT
HQ
PRESET
TPX01
TPX03
CLEAR
REC
ICX03
PROG/CFM
WEEK
CH(−)
CH(+)
DAY
HOUR/SEARCH
CH 10 MIN(−)
CH MIN(+)
FINE(−) MIN(−)
FINE(+) MIN(+)
VPS TIMER
OTR
QX02
GX01
ICX01
ICR01
MEMORY
RESET
COUNTER/ELAPSED
Toshiba
TLC-134 70196220
PX61 ↔ WX04
PL61 ↔ WX05
PL64 ↔ WX01
UX02 Timer PC Board

U002 Timer 2, VPS PC Board

9-4. Timer, Display, Timer 2, VPS, Logic Switch Circuit (DV-90G)


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
U002 TIMER 2, VPS
V: REC MODE
( ): PLAY MODE
UX01 TIMER, DISPLAY
( ): PLAY MODE
UL01 LOGIC SW
( ): PLAY MODE
ICX66 SAA5235
ICX65 SAF1135P
ICX64 TMP47C410AN6696Z
ICX01 TMP47C870N4845Z
ICR01 μPC1474HA
PEAK DET
BAND PASS FILTER
AMP
GX01 FIP14GM6
WEEKLY
VPS
SU MO TU WE TH FR SA
REC
VTR
LINE CATV
ON
OFF
LP
AM PM
TV STL
ICL63 PST520D
ICX03 PST-520C
QL60 RN1206 SWITCH
QL62 RN1204 SWITCH
QL61 RN1206 SWITCH
QX63 2SA1048-Y
QX61 RN1204
QX02 2SC2458-Y
Z802
ZL62 ICP-N10
TO P804 U802 POWER
TO P601 U202 LOGIC
TO P602 U202 LOGIC
TO PIF
TO P203 U202 VIDEO
TO P507 U202 SERVO
TO P202 U202 VIDEO
DX18 TLG133A-FA POWER LED
SL08 REW/REV
SL09 EJECT
SL07 PLAY
SL06 FF/CUE
SX20 ON/STAND BY
SL10 TV STILL
SL05 PAUSE/STILL
SL03 STOP
SL02 REC
SX18 COUNTER/ELAPSED
SX09 CH(+)
SX07 ON MIN(+) CH I
SX21 WEEK
SX01 CLOCK SET
SX17 RESET
SX10 CH(-)
SX08 ON MIN(-) CHIO
SX05 DAY
SX02 PROG/CFM
SX16 MEMORY
SX19 PRESET
SX11 OFF MIN(+) FINE(+)
SX06 HOUR SEARCH
SX13 TIMER
SX22 VPS
SX12 OFF MIN(-) FINE(-)
SX04 CLEAR
SX03 OTR
HP EDIT HQ S201
V: 5V/div.
H: 10ms/div.
V: 10V/div.
H: 10ms/div.
V: 10V/div.
H: 5ms/div.
V: 10V/div.
H: 5ms/div.
V: 2V/div.
H: 5ms/div.
V: 1V/div.
H: 2ms/div.
V: 1V/div.
H: 2ms/div.
V: 2V/div.
H: 0.2μs/div.
V: 1V/div.
H: 2ms/div.
V: 2V/div.
H: 20ms/div.
V: 0.5V/div.
H: 50ns/div.
V: 2V/div.
H: 20ms/div.
V: 2V/div.
H: 20ms/div.
V: 2V/div.
H: 0.2μs/div.
V: 2V/div.
H: 20ms/div.
V: 2V/div.
H: 0.2μs/div.
V: 2V/div.
H: 10ms/div.

9-5. Timer, Display, Timer 2, Logic Switch PC Board (DV-90T/W)


1
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9
10
11
A
B
C
D
E
F
G
UL01 Logic Control Switch PC Board
LOGIC SW
TLC-134
70196224
TRACKING
PICTURE
REW/REVIEW
PLAY
FF/CUE
PAUSE/STILL
STOP
TV-STILL
ON/STANDBY
EJECT
R556
R358
WX06
WX06
6 — 1
4 — 1 To U202 Main PC Board, P203
6 5 To U202 Main PC Board, P507
PX01A ↔ PX01B
To U202 Main PC Board, P601
PL65
2 1
To U202 Main PC Board, P602
WL61
1 — 11
To U802 Power PC Board, P804
PL63
11 — 1
PX03
1 — 3 To U202 Main PC Board, P202
TIMER
CLOCK SET
REC
ICX03
QX02
PROG/CFM
WEEK
CH(−)
CH(+)
DAY
HOUR/SEARCH
CH 10 MIN(−)
CH 1 MIN(+)
FINE(−) MIN(−)
FINE(+) MIN(+)
TIMER
PRESET
TPX01
TPX03
CLEAR
OTR
MEMORY
RESET
COUNTER ELAPSED
GX01
ICX01
ICR01
TLC-134 70196346
WX02
↕
PL62
UX02 Timer 2 PC Board
TIMER II
QL61
QL62
QL60
ICL63
PL61 ↔ WX05
PL64 ↔ WX01
U002 Timer 2 PC Board

Voltage and Location of Transistors   V : REC MODE
(V): PLAY MODE

Symbol No.	Voltage (Unit:V)			Loca-tion
	E	C	B	
QL60	—	2.0(2.0)	0(0)	F-4
QL61	0(0)	2.7(0)	0(0)	F-4
QL62	0(0)	2.7(0)	1.3(5.0)	F-3
QX02	2.5	5.1	2.8	E-7

Location of Adjusting VR's

Symbol No.	Loca-tion
R358	A-4
R556	A-4

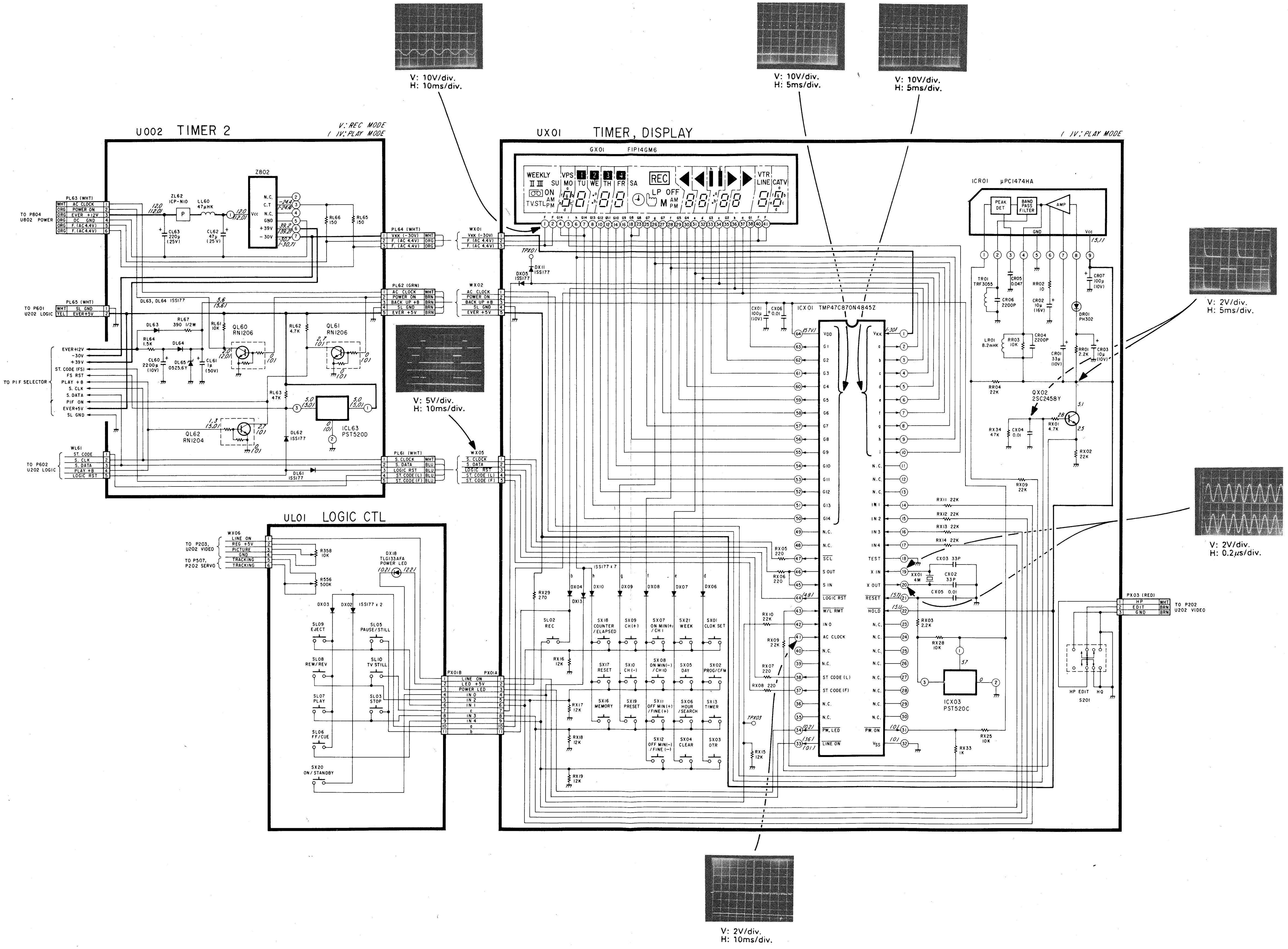
Location of IC's

Symbol No.	Loca-tion
ICL63	F-3
ICR01	F-6
ICX01	F-9
ICX03	E-5

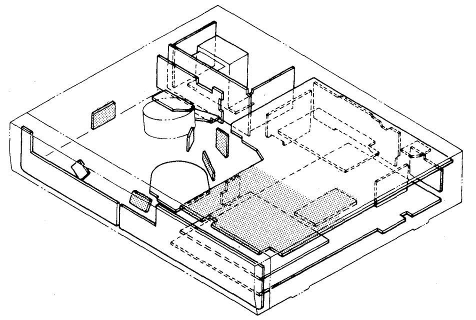
Location of Diodes

Symbol No.	Loca-tion
DL61	F-3
DL62	F-3
DL63	F-2
DL64	F-2
DL65	G-3
DR01	F-6
DX02	B-7
DX03	A-7
DX04	E-5
DX05	E-11
DX06	E-10
DX07	E-9
DX08	E-9
DX09	E-9
DX10	F-11
DX11	F-11
DX13	E-8
DX18	C-3

9-6. Timer, Display, Timer 2, Logic Switch Circuit (DV-90T/W)


V: 10V/div.
H: 10ms/div.
V: 10V/div.
H: 5ms/div.
V: 10V/div.
H: 5ms/div.
V: 2V/div.
H: 5ms/div.
V: 5V/div.
H: 10ms/div.
V: 2V/div.
H: 0.2μs/div.
V: 2V/div.
H: 10ms/div.
U002 TIMER 2
V: REC MODE
( )V: PLAY MODE
TO P804 U802 POWER
PL63 (WHT)
AC CLOCK
POWER ON
EVER +12V
DC GND
F. (AC4.4V)
ZL62 ICP-N10
LL60 47μHK
CL63 220μ (25V)
CL62 47μ (25V)
Z802
N.C.
C.T
GND
+39V
-30V
Vcc
RL66 150
RL65 150
PL64 (WHT)
VKK (-30V)
F. (AC 4.4V)
TO P601 U202 LOGIC
PL65 (WHT)
SL GND
EVER+5V
PL62 (GRN)
AC CLOCK
POWER ON
BACK UP +B
SL GND
EVER +5V
DL63, DL64 1SS177
DL63
RL67 390 1/2W
RL64 1.5K
DL64
CL60 2200μ (10V)
DL65 05Z5.6Y
CL61 1μ (50V)
RL61 10K
QL60 RN1206
RL62 4.7K
QL61 RN1206
RL63 47K
ICL63 PST520D
QL62 RN1204
DL62 1SS177
DL61 1SS177
TO PIF SELECTOR
EVER+12V
-30V
+39V
ST. CODE (FS)
FS RST
PLAY +B
S. CLK
S. DATA
PIF ON
EVER+5V
SL GND
TO P602 U202 LOGIC
WL61
ST. CODE
S. CLK
S. DATA
PLAY +B
LOGIC RST
PL61 (WHT)
S. CLOCK
S. DATA
LOGIC RST
ST. CODE (L)
ST. CODE (F)
WX01
WX02
WX05
UL01 LOGIC CTL
TO P203, U202 VIDEO
TO P507, P202 SERVO
WX06
LINE ON
REG +5V
PICTURE
GND
TRACKING
R358 10K
R556 500K
DX18 TLG133AFA POWER LED
DX03
DX02
1SS177 x 2
SL09 EJECT
SL05 PAUSE/STILL
SL08 REW/REV
SL10 TV STILL
SL07 PLAY
SL03 STOP
SL06 FF/CUE
SX20 ON/STANDBY
PX01B
PX01A
LINE ON
LED +5V
POWER LED
IN 0
IN 2
IN 1
IN 3
IN 4
UX01 TIMER, DISPLAY
GX01 FIP14GM6
WEEKLY
VPS
SU MO TU WE TH FR SA
ON
AM PM
TV.STL
REC
LP OFF
M
VTR LINE
CATV
TPX01
DX11 1SS177
DX05 1SS177
ICX01 TMP47C870N4845Z
CX01 100μ (10V)
CX06 0.01
VDD
VKK
G1
G2
G3
G4
G5
G6
G7
G8
G9
G10
G11
G12
G13
G14
N.C.
SCL
S OUT
S IN
LOGIC RST
W/L RMT
IN 0
AC CLOCK
ST CODE (L)
ST CODE (F)
PW. LED
LINE ON
TEST
X IN
X OUT
RESET
HOLD
PW. ON
VSS
IN 1
IN 2
IN 3
IN 4
RX05 220
RX06 220
RX10 22K
RX09 22K
RX07 220
RX08 220
RX29 270
1SS177 x 7
DX04
DX13
DX10
DX09
DX08
DX07
DX06
SL02 REC
SX18 COUNTER /ELAPSED
SX09 CH(+)
SX07 ON MIN(+) /CH1
SX21 WEEK
SX01 CLOK SET
SX17 RESET
SX10 CH(-)
SX08 ON MIN(-) /CH10
SX05 DAY
SX02 PROG/CFM
SX16 MEMORY
SX19 PRESET
SX11 OFF MIN(+) /FINE(+)
SX06 HOUR /SEARCH
SX13 TIMER
SX12 OFF MIN(-) /FINE(-)
SX04 CLEAR
SX03 OTR
RX16 12K
RX17 12K
RX18 12K
RX19 12K
TPX03
RX15 12K
RX11 22K
RX12 22K
RX13 22K
RX14 22K
CX03 33P
XX01 4M
CX02 33P
CX05 0.01
RX03 2.2K
RX28 10K
ICX03 PST520C
RX25 10K
RX33 1K
ICR01 μPC1474HA
PEAK DET
BAND PASS FILTER
AMP
GND
Vcc
TR01 TRF3055
CR05 0.047
CR06 2200P
RR02 10
CR02 10μ (16V)
CR07 100μ (10V)
DR01 PH302
LR01 8.2mHK
RR03 10K
CR04 2200P
CR01 33μ (10V)
RR01 2.2K
CR03 10μ (10V)
RR04 22K
QX02 2SC2458Y
RX34 47K
CX04 0.01
RX01 4.7K
RX02 22K
RX09 22K
PX03 (RED)
HP
EDIT
GND
TO P202 U202 VIDEO
HP EDIT HQ
S201

10-2. Logic PC Board



Location of Diodes

Symbol No.	Location
D605	C-6
D606	D-9
D607	D-9
D609	C-9
D611	B-6
D612	C-6

Location of IC's

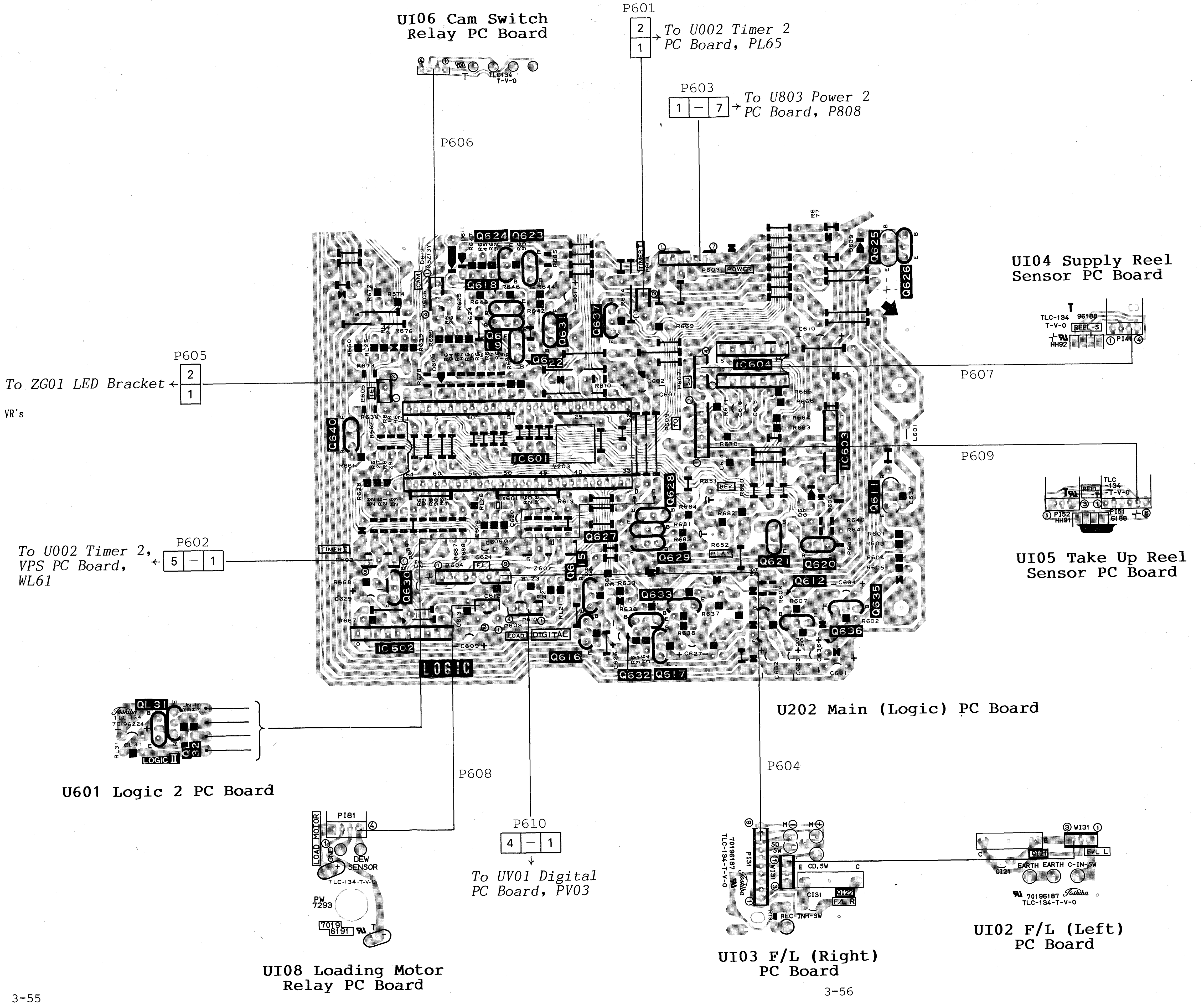
Symbol No.	Location
IC601	D-7
IC602	E-6
IC603	D-9
IC604	C-8

Location of Adjusting VR's

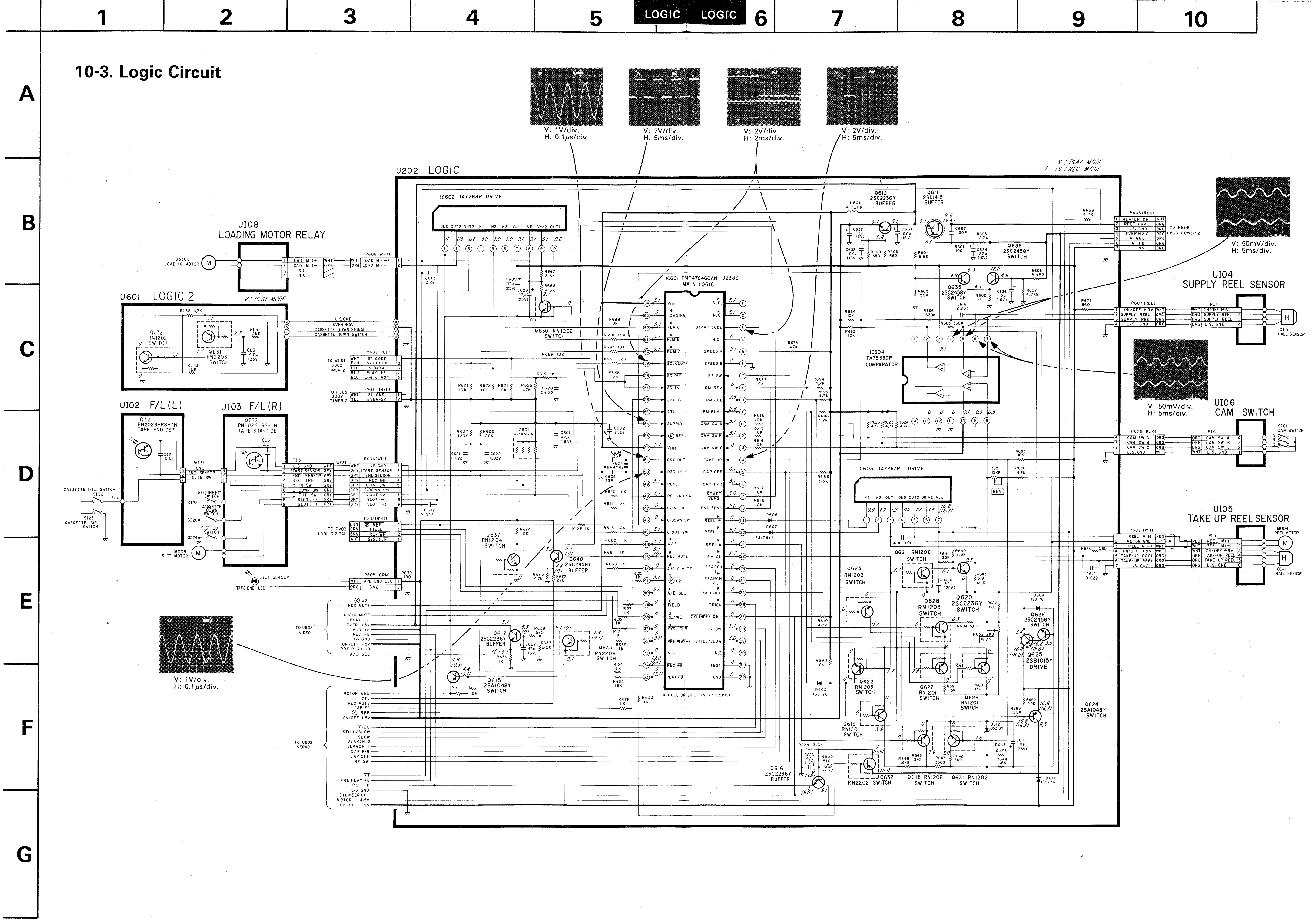
Symbol No.	Location
R651	D-8
R652	E-8

Voltage and Location of Transistors

Symbol No.	Voltage (Unit:V)			Location
	E	C	B	
Q611	5.1	9.6(9.4)	6.3	D-9
Q612	5.1	5.1	5.8	E-9
Q615	5.1	4.9(0.3)	4.4(5.1)	E-7
Q616	0(9.0)	9.1	0(9.8)	E-7
Q617	5.1(0)	5.1	5.8(0)	F-8
Q618	0	3.9	0	C-6
Q619	0	3.9	0	C-6
Q620	0	0.5	0.1	E-9
Q621	0	0.1	2.7	E-8
Q622	0	0	2.7	C-7
Q623	0	16.7	0	B-7
Q624	16.8(16.2)	8.5	16.8(16.2)	B-6
Q625	16.8(16.2)	3.4	16.2(15.6)	C-9
Q626	3.4	16.2(15.6)	3.9	C-9
Q627	0	0	2.8	E-7
Q628	0	0.5	0	D-8
Q629	0	0	2.8	E-8
Q630	0	9.1	0	E-6
Q631	0	3.0	1.6	C-7
Q632	12.0	0(11.9)	12.0(1.1)	F-7
Q633	9.1	9.1(0)	1.8(9.1)	E-8
Q635	4.3	6.3	4.9	E-9
Q636	4.3	12.0	4.9	E-9
Q637	0	–	–	C-7
Q640	4.4(0)	5.1	5.1(0)	D-5
QL31	5.1	5.1	2.7	F-4
QL32	0	0	5.1	F-4

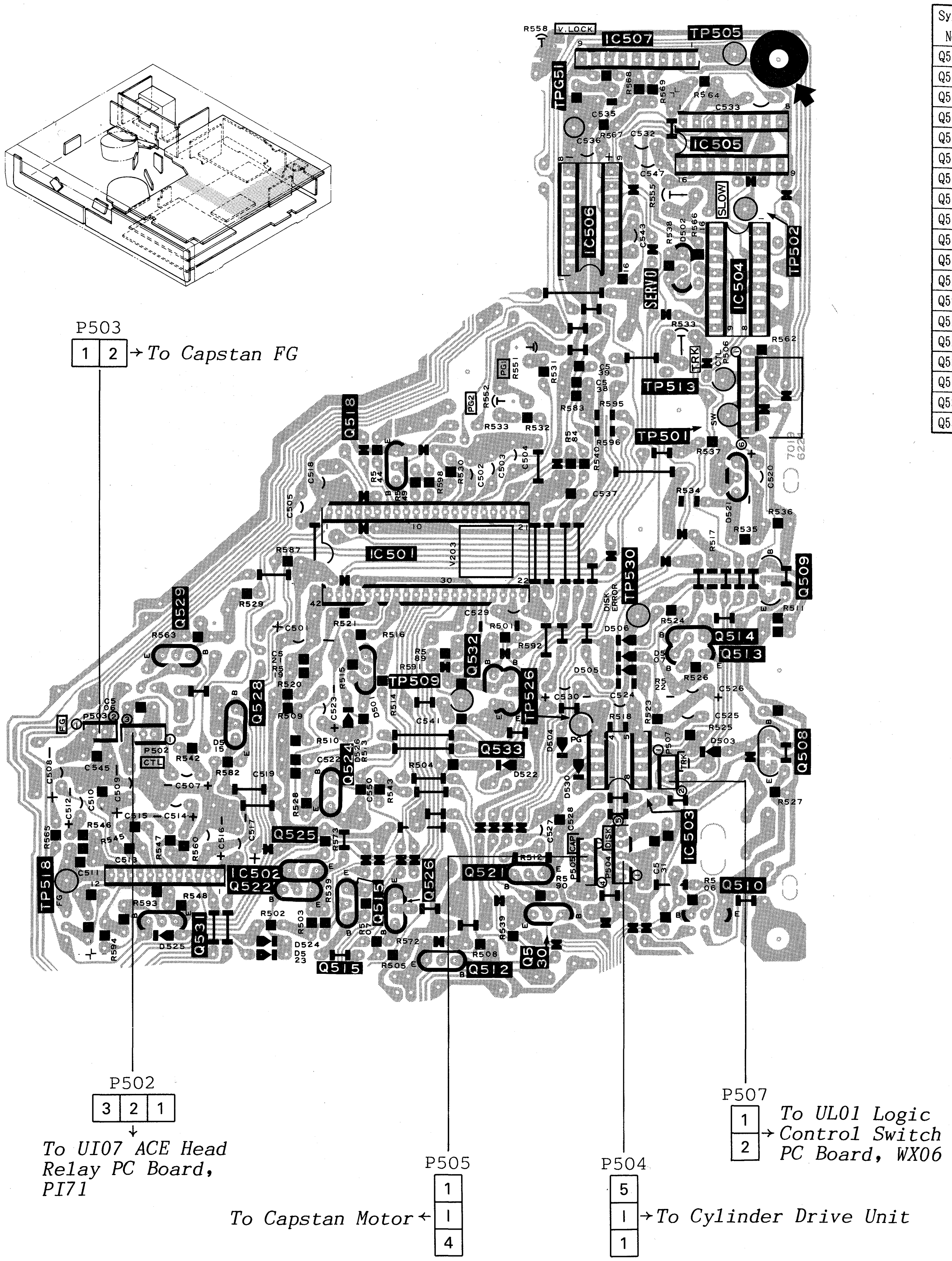

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
UI06 Cam Switch Relay PC Board
P601
2
1
To U002 Timer 2 PC Board, PL65
P603
1 – 7
To U803 Power 2 PC Board, P808
P606
UI04 Supply Reel Sensor PC Board
P605
2
1
To ZG01 LED Bracket
P607
P609
UI05 Take Up Reel Sensor PC Board
P602
5 – 1
To U002 Timer 2, VPS PC Board, WL61
IC601
IC602
IC603
IC604
LOGIC
U202 Main (Logic) PC Board
U601 Logic 2 PC Board
P608
P604
P610
4 – 1
To UV01 Digital PC Board, PV03
UI08 Loading Motor Relay PC Board
UI03 F/L (Right) PC Board
UI02 F/L (Left) PC Board

10-3. Logic Circuit


LOGIC
LOGIC
1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
V: 1V/div.
H: 0.1μs/div.
V: 2V/div.
H: 5ms/div.
V: 2V/div.
H: 2ms/div.
V: 2V/div.
H: 5ms/div.
V: PLAY MODE
( ) V: REC MODE
U202 LOGIC
IC602 TA7288P DRIVE
IC601 TMP47C460AN-9238Z
MAIN LOGIC
* PULL UP BUILT IN (TYP. 5KΩ)
Q612 2SC2236Y BUFFER
Q611 2SD1415 BUFFER
Q636 2SC2458Y SWITCH
Q635 2SC2458Y SWITCH
Q630 RN1202 SWITCH
IC604 TA75339P COMPARATOR
IC603 TA7267P DRIVE
Q637 RN1204 SWITCH
Q640 2SC2458Y BUFFER
Q617 2SC2236Y BUFFER
Q633 RN2206 SWITCH
Q615 2SA1048Y SWITCH
Q621 RN1206 SWITCH
Q623 RN1203 SWITCH
Q628 RN1203 SWITCH
Q620 2SC2236Y SWITCH
Q626 2SC2458Y SWITCH
Q625 2SB1015Y DRIVE
Q622 RN1203 SWITCH
Q627 RN1201 SWITCH
Q629 RN1201 SWITCH
Q619 RN1201 SWITCH
Q624 2SA1048Y SWITCH
Q616 2SC2236Y BUFFER
Q632 RN2202 SWITCH
Q618 RN1206 SWITCH
Q631 RN1202 SWITCH
U108 LOADING MOTOR RELAY
B556B LOADING MOTOR
P608 (WHT)
LOAD M (+)
LOAD M (−)
N.C.
U601 LOGIC 2
V: PLAY MODE
QL32 RN1202 SWITCH
QL31 RN2203 SWITCH
L.S.GND
EVER +5V
CASSETTE DOWN SIGNAL
CASSETTE DOWN SWITCH
TO WL61 U002 TIMER 2
P602 (RED)
ST. CODE
S. CLOCK
S. DATA
PLAY +B
LOGIC RST
TO PL65 U002 TIMER 2
P601 (RED)
SL GND
EVER +5V
U102 F/L (L)
Q121 PN202S-RS-TH TAPE END DET
U103 F/L (R)
Q122 PN202S-RS-TH TAPE START DET
P231
P604 (WHT)
L.S GND
START SENSOR
END SENSOR
REC INH
C.IN SW
C.DOWN SW
C.OUT SW
SLOT (−)
SLOT (+)
CASSETTE (NL) SWITCH S122
S123 CASSETTE (NR) SWITCH
S125 REC INHIBIT SWITCH
CASSETTE DOWN SWITCH
S126 SLOT OUT SWITCH
S124
M005 SLOT MOTOR
TO PV03 UV01 DIGITAL
P610 (WHT)
P605 (GRN)
D101 GL450V
TAPE END LED
TO U602 VIDEO
REC MUTE
AUDIO MUTE
PLAY +B
EVER +5V
MOD +B
REC +B
A-V GND
ON/OFF +5V
PRE PLAY +B
A/D SEL
TO U602 SERVO
MOTOR GND
CTL
REC MUTE
CAP FG
Ⓚ REF
ON/OFF +5V
TRICK
STILL/SLOW
SLOW
SEARCH 2
SEARCH 1
CAP F/R
CAP OFF
RF SW
PRE PLAY +B
REC +B
L-S GND
CYLINDER OFF
MOTOR +14.5V
ON/OFF +9V
P603 (RED)
HEATER ON
RECT +9V
L-S. GND
EVER +12V
M GND
M +B
+9V
TO P808 U803 POWER 2
V: 50mV/div.
H: 5ms/div.
U104 SUPPLY REEL SENSOR
P607 (RED)
ON/OFF +9V
SUPPLY REEL
L-S. GND
P141
Q151 HALL SENSOR
U106 CAM SWITCH
P606 (BLK)
CAM SW A
CAM SW B
CAM SW C
P161
S161 CAM SWITCH
U105 TAKE UP REEL SENSOR
P609 (WHT)
REEL M (+)
MOTOR GND
REEL M (−)
TAKE-UP REEL
P151
M004 REEL MOTOR
Q141 HALL SENSOR
V: 1V/div.
H: 0.1μs/div.

11-2. Servo PC Board

U202 Main (Servo) PC Board


P503
1 2 → To Capstan FG
P502
3 2 1
To UI07 ACE Head Relay PC Board, PI71
P505
1 I 4
To Capstan Motor ←
P504
5 I 1
→ To Cylinder Drive Unit
P507
1 2
→ To UL01 Logic Control Switch PC Board, WX06
IC501
IC502
IC503
IC504
IC505
IC506
IC507
TP501
TP502
TP505
TP509
TP513
TP518
TP526
TP530
TP551
Q508
Q509
Q510
Q512
Q513
Q514
Q515
Q518
Q521
Q522
Q524
Q525
Q526
Q528
Q529
Q530
Q531
Q532
Q533
V.LOCK
SERVO
SLOW
TRK
CTL
FG
PG
DISK

Voltage and Location of Transistors

V : REC MODE
(V): PLAY MODE

Symbol No.	Voltage (Unit:V)			Location
	E	C	B	
Q508	2.00(1.97)	16.82(17.42)	3.24(3.15)	E-5
Q509	5.34(5.26)	17.40(16.84)	6.60(6.51)	D-5
Q510	0(0)	3.24(3.14)	0.06(0.06)	F-5
Q512	5.07(5.06)	0(0)	5.07(5.06)	F-3
Q513	2.58(2.54)	1.30(0.65)	2.54(2.50)	D-4
Q514	0(0)	2.57(2.50)	0(0)	D-4
Q515	5.07(5.06)	0(0)	5.06(5.06)	F-3
Q518	0(0)	2.35(2.35)	2.08(2.08)	C-3
Q521	5.27(5.33)	0.03(0.03)	6.46(6.53)	E-3
Q522	0(0)	0(0)	4.7(4.7)	F-2
Q524	0(0)	2.5(2.5)	0(0)	E-3
Q525	0(0)	4.3(4.3)	0(0)	E-2
Q526	0(0)	5.1(5.1)	0(0)	F-3
Q528	5.1(5.1)	0.5(0.5)	5.1(5.1)	E-2
Q529	5.1(5.1)	5.1(5.1)	0.5(0.5)	D-2
Q530	0(0)	6.5(6.5)	0(0)	F-4
Q531	2.1(2.1)	2.1(2.1)	1.5(1.5)	F-2
Q532	0(0)	0.5(0.5)	0.5(0.5)	D-3
Q533	0(0)	2.5(2.5)	0.5(0.5)	E-3

Location of IC's

Symbol No.	Location
IC501	D-3
IC502	E-2
IC503	E-4
IC504	B-5
IC505	B-5
IC506	B-4
IC507	A-4

Location of Adjusting VR's

Symbol No.	Location
R533	C-4
R551	C-3
R552	C-3
R555	B-4
R558	A-4

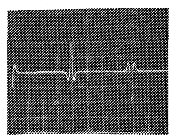
Location of Diodes

Symbol No.	Location
D501	E-3
D502	B-4
D503	E-4
D504	E-4
D505	D-4
D506	D-4
D507	D-4
D515	E-2
D521	D-5
D522	E-3
D523	F-2
D524	F-2
D525	F-2
D530	E-4

Cylinder Servo

① TP526

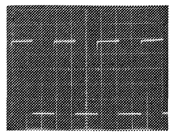
C-5



V: 0.5V/div.
H: 5ms/div.

② IC501, Pin ㉞, ㉟

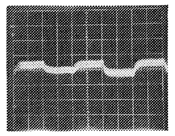
C-8



V: 1V/div.
H: 10μs/div.

③ TP530

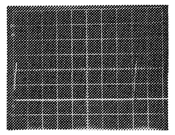
F-7



V: 0.1V/div.
H: 10ms/div.

④ IC501, Pin ⑯

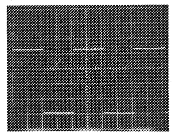
D-10



V: 1V/div.
H: 5ms/div.

⑤ IC501, Pin ⑨

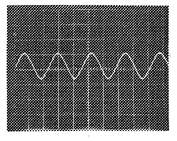
C-10



V: 1V/div.
H: 10ms/div.

⑥ IC501, Pin ㉒

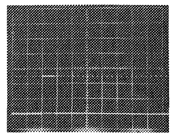
E-9



V: 0.2V/div.
H: 0.1μs/div.

⑦ IC501, Pin ⑧

C-10

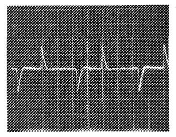


V: 2V/div.
H: 0.2ms/div.

Capstan Servo

⑧ IC502, Pin ⑦

D-12

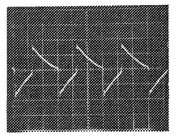


(Play)

V: 0.5V/div.
H: 10ms/div.

⑨ IC502, Pin ⑦

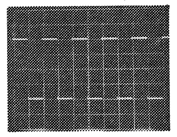
D-12



(Cue/F

V: 0.5V/div.
H: 2ms/div.

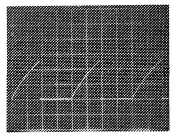
⑩ IC501, Pin ⑲



V: 1V/div.
H: 1ms/div.

⑪ IC501, Pin ④

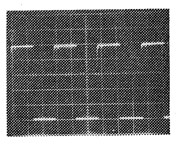
C-10



V: 1V/div.
H: 10ms/div.

⑫ IC501, Pin ㊱, ㊲

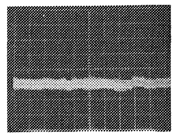
C-8



V: 1V/div.
H: 10μs/div.

⑬ Q508, Emitter

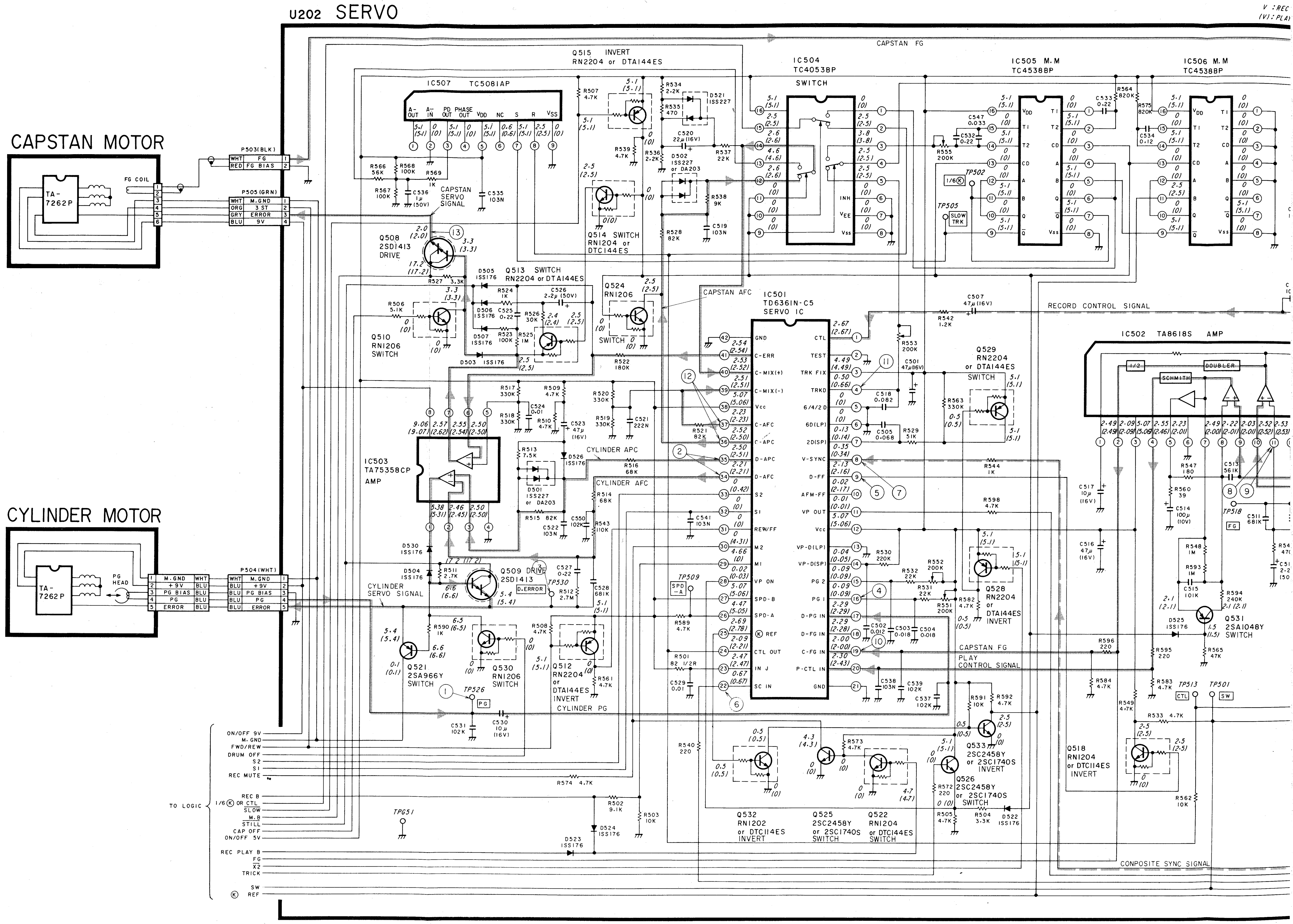
C-5



(Play)

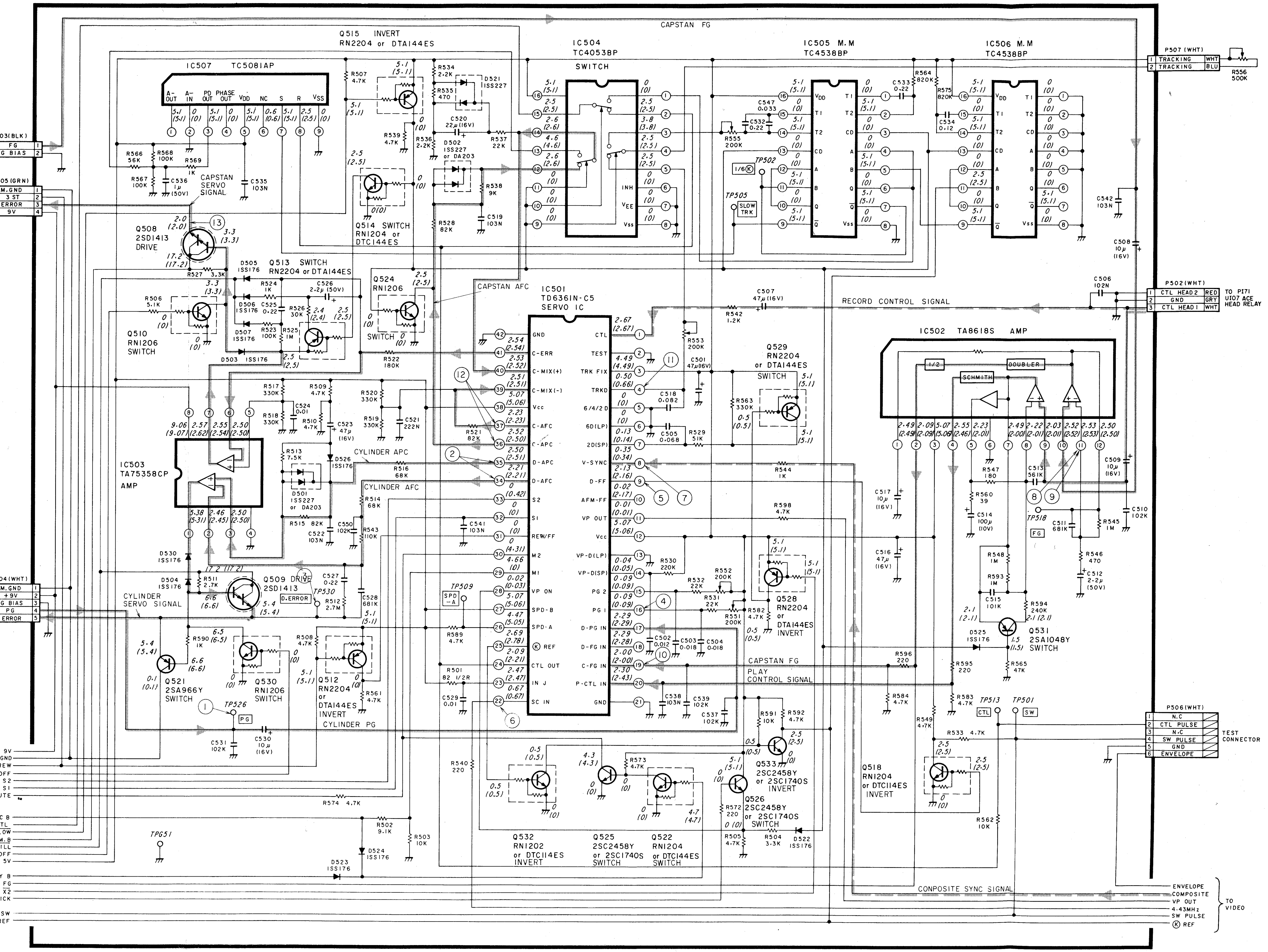
V: 1V/div.
H: 5ms/div.

11-3. Servo Circuit

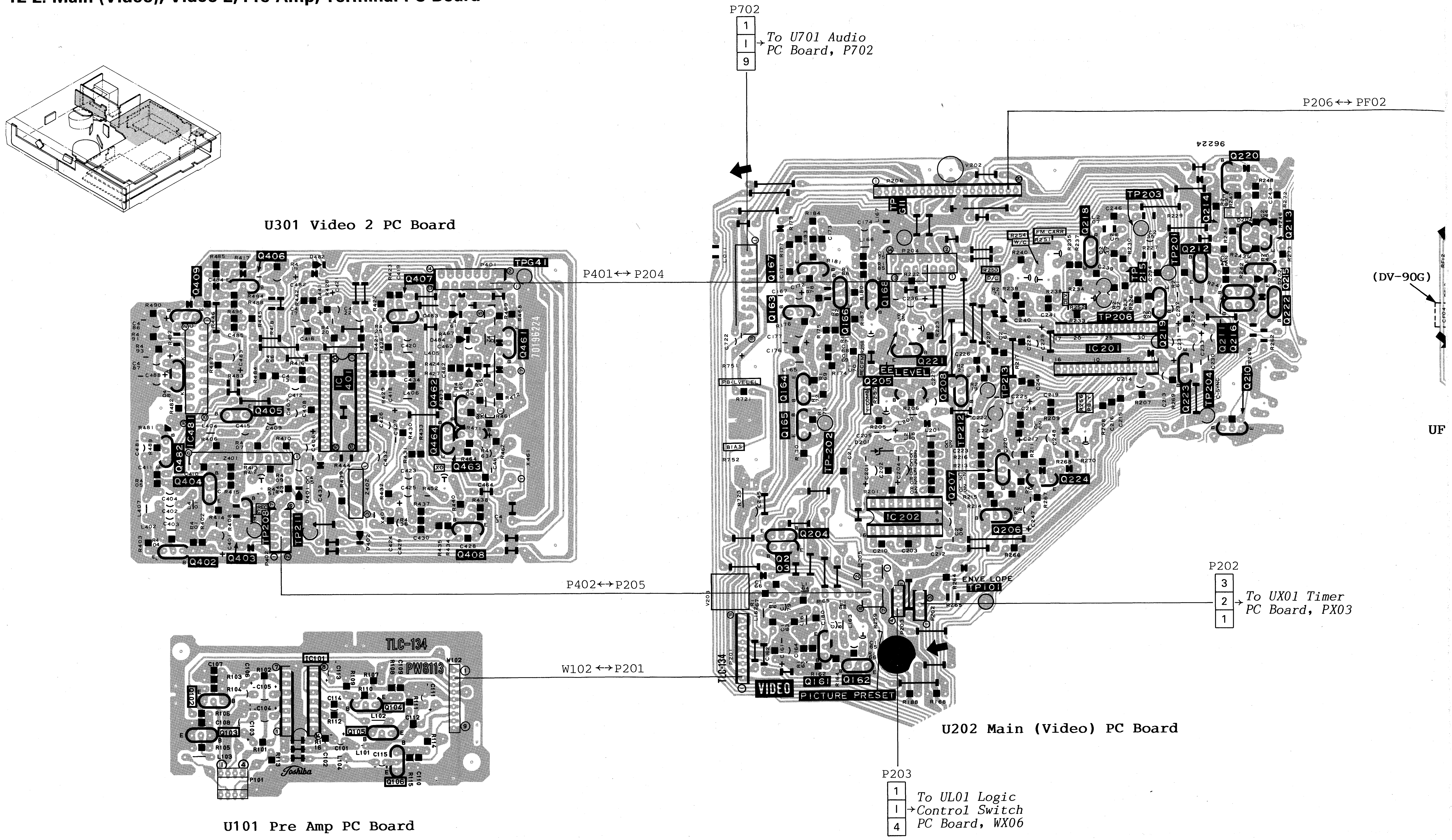

U202 SERVO
CAPSTAN MOTOR
TA-7262P
FG COIL
P503(BLK)
WHT FG
RED FG BIAS
P505(GRN)
WHT M.GND
ORG 3 ST
GRY ERROR
BLU 9V
CYLINDER MOTOR
TA-7262P
PG HEAD
P504(WHT)
M.GND
+9V
PG BIAS
PG
ERROR
IC507 TC5081AP
CAPSTAN SERVO SIGNAL
Q508 2SD1413 DRIVE
Q510 RN1206 SWITCH
Q513 SWITCH RN2204 or DTA144ES
Q515 INVERT RN2204 or DTA144ES
Q514 SWITCH RN1204 or DTC144ES
Q524 RN1206 SWITCH
IC504 TC4053BP SWITCH
IC505 M.M TC4538BP
IC506 M.M TC4538BP
CAPSTAN FG
CAPSTAN AFC
IC501 TD6361N-C5 SERVO IC
RECORD CONTROL SIGNAL
IC502 TA8618S AMP
SCHMITH
DOUBLER
Q529 RN2204 or DTA144ES SWITCH
IC503 TA75358CP AMP
CYLINDER APC
CYLINDER AFC
Q509 DRIVE 2SD1413
D.ERROR
CYLINDER SERVO SIGNAL
Q521 2SA966Y SWITCH
Q530 RN1206 SWITCH
Q512 RN2204 or DTA144ES INVERT
CYLINDER PG
Q528 RN2204 or DTA144ES INVERT
Q531 2SA1048Y SWITCH
CAPSTAN FG
PLAY CONTROL SIGNAL
Q533 2SC2458Y or 2SC1740S INVERT
Q526 2SC2458Y or 2SC1740S SWITCH
Q532 RN1202 or DTC114ES INVERT
Q525 2SC2458Y or 2SC1740S SWITCH
Q522 RN1204 or DTC144ES SWITCH
Q518 RN1204 or DTC114ES INVERT
COMPOSITE SYNC SIGNAL
TO LOGIC
ON/OFF 9V
M.GND
FWD/REW
DRUM OFF
S2
S1
REC MUTE
REC B
1/6Ⓚ OR CTL
SLOW
M.B
STILL
CAP OFF
ON/OFF 5V
REC PLAY B
FG
X2
TRICK
SW
Ⓚ REF
TP501 SW
TP502
TP505 SLOW TRK
TP509 SPD-A
TP513 CTL
TP518 FG
TP526 PG
TP530
TP651
V : REC
(V) : PLAY

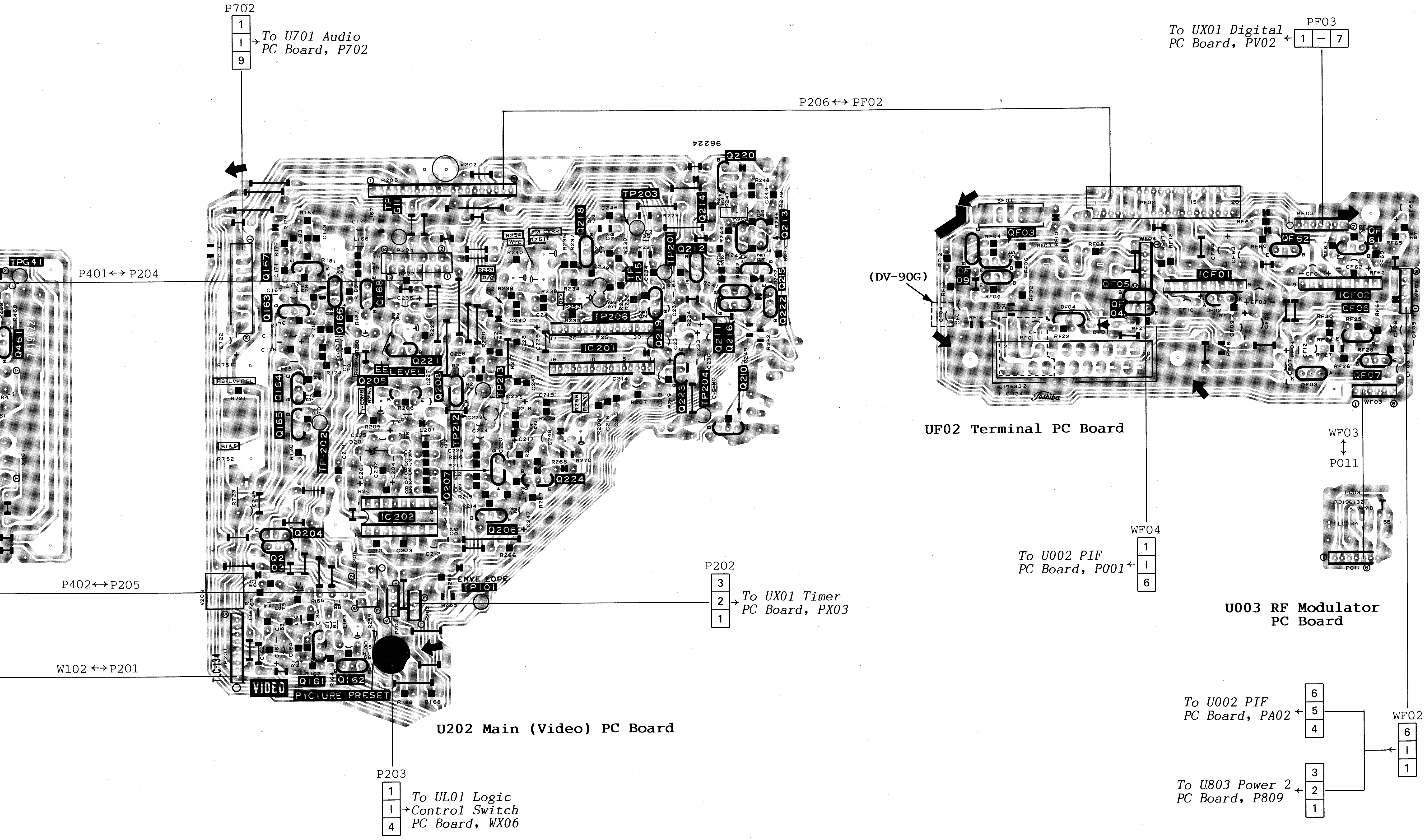
U202 SERVO

V :REC MODE
(V):PLAY MODE


CAPSTAN FG
IC507 TC5081AP
Q515 INVERT RN2204 or DTA144ES
IC504 TC4053BP SWITCH
IC505 M.M TC4538BP
IC506 M.M TC4538BP
P507 (WHT)
TRACKING
R556 500K
FG
G BIAS
M.GND
3 ST
ERROR
9V
CAPSTAN SERVO SIGNAL
Q508 2SD1413 DRIVE
Q514 SWITCH RN1204 or DTC144ES
Q513 SWITCH RN2204 or DTA144ES
Q524 RN1206 SWITCH
Q510 RN1206 SWITCH
CAPSTAN AFC
IC501 TD6361N-C5 SERVO IC
RECORD CONTROL SIGNAL
P502(WHT)
CTL HEAD2
GND
CTL HEAD1
TO P171 U107 ACE HEAD RELAY
IC502 TA8618S AMP
1/2
DOUBLER
SCHMITH
Q529 RN2204 or DTA144ES SWITCH
TP502
TP505 SLOW TRK
CYLINDER APC
CYLINDER AFC
IC503 TA75358CP AMP
Q509 2SD1413 DRIVE
D.ERROR
TP530
CYLINDER SERVO SIGNAL
PG
Q521 2SA966Y SWITCH
Q530 RN1206 SWITCH
Q512 RN2204 or DTA144ES INVERT
CYLINDER PG
TP526
TP509 SPD-A
GND
C-ERR
C-MIX(+)
C-MIX(-)
Vcc
C-AFC
C-APC
D-APC
D-AFC
S2
S1
REW/FF
M2
M1
VP ON
SPD-B
SPD-A
Ⓚ REF
CTL OUT
IN J
SC IN
CTL
TEST
TRK FIX
TRKD
6/4/2D
6D(LP)
2D(SP)
V-SYNC
D-FF
AFM-FF
VP OUT
VP-D(LP)
VP-D(SP)
PG 2
PG 1
D-PG IN
D-FG IN
C-FG IN
P-CTL IN
Q528 RN2204 or DTA144ES INVERT
CAPSTAN FG
PLAY CONTROL SIGNAL
Q531 2SA1048Y SWITCH
TP518 FG
TP513 CTL
TP501 SW
P506(WHT)
N.C
CTL PULSE
N.C
SW PULSE
GND
ENVELOPE
TEST CONNECTOR
Q533 2SC2458Y or 2SC1740S INVERT
Q526 2SC2458Y or 2SC1740S SWITCH
Q518 RN1204 or DTC114ES INVERT
Q532 RN1202 or DTC114ES INVERT
Q525 2SC2458Y or 2SC1740S SWITCH
Q522 RN1204 or DTC114ES SWITCH
TPG51
COMPOSITE SYNC SIGNAL
ENVELOPE
COMPOSITE
VP OUT
4.43MHz
SW PULSE
Ⓚ REF
TO VIDEO
9V
GND
REW
OFF
S2
S1
MUTE
C B
CTL
LOW
4.8
ILL
OFF
5V
Y B
FG
X2
ICK
SW
REF

12-2. Main (Video), Video 2, Pre Amp, Terminal PC Board


P702
1
I
9
To U701 Audio PC Board, P702
P206↔PF02
U301 Video 2 PC Board
P401↔P204
P402↔P205
W102↔P201
TLC-134
PW8113
Toshiba
P202
3
2
1
To UX01 Timer PC Board, PX03
(DV-90G)
UF
VIDEO
PICTURE PRESET
ENVE LOPE
U202 Main (Video) PC Board
P203
1
I
4
To UL01 Logic Control Switch PC Board, WX06
U101 Pre Amp PC Board


P702
1
|
9
To U701 Audio PC Board, P702
P206↔PF02
PF03
1 — 7
To UX01 Digital PC Board, PV02
P401↔P204
P402↔P205
W102↔P201
(DV-90G)
UF02 Terminal PC Board
WF03
↕
P011
WF04
1
|
6
To U002 PIF PC Board, P001
P202
3
2
1
To UX01 Timer PC Board, PX03
U003 RF Modulator PC Board
U202 Main (Video) PC Board
P203
1
|
4
To UL01 Logic Control Switch PC Board, WX06
6
5
4
To U002 PIF PC Board, PA02
WF02
6
|
1
3
2
1
To U803 Power 2 PC Board, P809
VIDEO
PICTURE PRESET
ENVE LOPE TP101
EE LEVEL
PB LEVEL
BIAS
FM CARR
IC201
IC202
IC202
TP203
TP206
TPG41
ICF01
ICF02
TLC-134
70196332
70196224
96224
Toshiba

Voltage and Location Transistors

(Unit:V)

Symbol No.	REC MODE			PLAY MODE			Location
	E	C	B	E	C	B	
Q102	0	0	0.77	0	0	0	F-2
Q103	0	0	0.77	0	0	0	G-3
Q104	0	0	0	1.81	5.0	2.46	F-4
Q105	0	0	0	2.26	5.14	2.90	G-4
Q106	0	4.42	0	0	0	0.75	G-4
Q161	0	0	0	0.57	3.20	1.25	F-7
Q162	0	0	0	2.58	5.14	3.20	F-8
Q163	0	–	0	0	0	4.31	C-7
Q164	8.40	4.49	7.68	0	0	0	D-7
Q165	0.62	4.50	1.35	0	0	0	D-7
Q166	4.24	9.02	4.94	0	0	0	C-7
Q167	0.30	4.94	0.96	0	0	0	C-7
Q168	2.92	0	2.25	0	0	2.48	C-8
Q203	0	9.11	0	0	0.06	5.14	E-7
Q204	9.11	0	9.11	9.09	8.72	0.06	E-7
Q205	0	0	0	2.47	0	1.80	D-8
Q206	0	0	0	0	0	0	E-9
Q207	0.81	2.95	1.45	0.81	2.92	1.44	E-8
Q208	0	0.89	0	0	0.88	0	D-8
Q210	0	0	0	0	0.02	0	D-11
Q211	5.06	0	5.10	5.10	0	5.05	C-10
Q212	0	0	0.63	0	0	0.62	C-10
Q213	0	0.07	0.67	0	0.06	0.66	C-11
Q214	0	5.06	0.07	0	5.05	0.06	C-10
Q215	5.06	3.04	5.09	5.05	3.03	5.07	C-11
Q216	0	5.08	1.63	5.05	5.07	1.62	C-11
Q218	0	0	0.19	0	0	4.92	C-9
Q219	5.06	5.04	0.19	5.05	3.06	4.92	C-10
Q220	5.06	1.71	2.19	5.05	7.83	0.16	B-11
Q221	2.45	0	1.82	2.99	0	2.35	D-8
Q222	5.06	0	5.01	5.06	0.17	5.02	C-11
Q223	0	0 2.1	0 3.9	0	0 2.1	0 3.9	D-10
Q224	3.2	3.1	0	3.2	0	5	E-9
Q402	0	0	0	0.86	5.13	1.51	E-2
Q403	1.30	0	0.04	1.92	0	1.27	E-3
Q404	0.44	3.16	1.12	0.44	3.16	1.12	E-2
Q405	2.51	5.06	3.15	2.56	5.06	3.15	D-3
Q406	0.98	5.06	1.61	0.98	5.06	1.61	C-3
Q407	2.92	5.06	3.59	2.92	5.06	3.59	C-4
Q408	2.02	5.02	2.65	2.01	5.06	2.65	E-4
Q409	–	–	–	–	–	–	C-3
Q461	1.92	5.06	2.57	2.08	5.06	2.73	D-5
Q462	–	–	2.58	–	–	2.74	D-4
Q463	0.81	2.58	0.10	1.40	2.74	2.06	D-4
Q464	–	0.81	–	–	1.79	–	D-4
Q482	–	–	–	–	–	–	D-2
QF03	0	0.14	0.11	0	3.82	0.11	C-13
QF04	11.97	0	11.95	11.98	11.96	11.97	C-14
QF05	0	11.95	0.18	0	0	4.93	C-14
QF06	2.65	0	1.94	2.51	0	1.81	C-16
QF07	5.23	9.10	5.86	5.17	9.10	5.81	D-16
QF08	0	0	0.11	0	0	0.11	C-13
QF09	0	0	0.68	0	0	0.67	C-12
QF61	–	–	–	–	–	–	C-16
QF62	–	–	–	–	–	–	C-15

Location of IC's

Symbol No.	Location
IC101	F-3
IC201	C-10
IC202	E-8
IC401	D-4
IC481	D-2
ICF01	C-14
ICF02	C-16

Location of Diodes

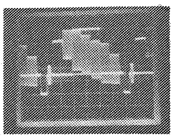
Symbol No.	Location
D201	D-8
D202	C-11
D204	C-11
D401	E-3
D402	E-4
D461	D-4
D481	D-2
D482	C-3
D483	C-4
D484	C-4
DF01	C-14
DF02	C-14
DF03	D-15
DF04	C-13

Location of Adjusting VR's

Symbol No.	Location
R251	C-9
R252	C-9
R253	C-9
R254	C-9
R255	C-8
R256	D-9
R257	D-8
R258	D-8
R259	F-8
R451	E-3
R452	E-4
R751	D-7
R752	D-7

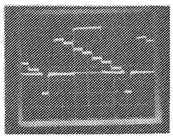
Record Mode

① TP201



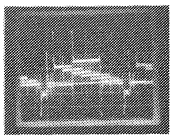
V: 0.2V/div.
H: 10μs/div.
C-8

② IC201, Pin ㉔



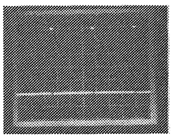
V: 0.1V/div.
H: 10μs/div.
B-10

③ TP206



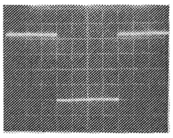
V: 0.2V/div.
H: 10μs/div.
B-10

④ TP204



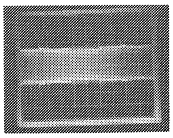
V: 1V/div.
H: 20μs/div.
A-8

⑤ Q220, Collector



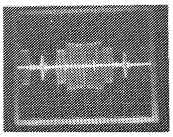
V: 1V/div.
H: 5ms/div.
F-11

⑥ TP202



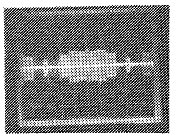
V: 0.1V/div.
H: 10μs/div.
F-7

⑦ IC401, ㉒



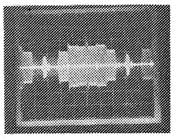
V: 0.05V/div.
H: 10μs/div.
D-15

⑧ IC401, Pin ⑯



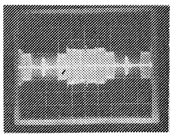
V: 0.5V/div.
H: 10μs/div.
D-16

⑨ IC401, Pin ㉚



V: 0.2V/div.
H: 10μs/div.
D-14

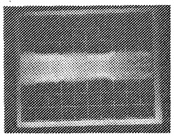
⑩ TP208



V: 0.1V/div.
H: 10μs/div.
F-13

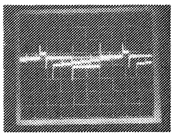
Playback Mode

⑪ TP101



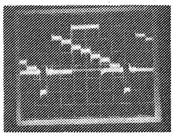
V: 0.1V/div.
H: 5ms/div.
G-12

⑫ Q207, Emitter



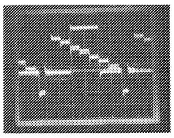
V: 0.2V/div.
H: 10μs/div.
E-10

⑬ TP212



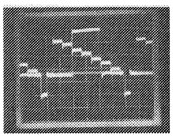
V: 0.1V/div.
H: 10μs/div.
D-10

⑭ TP213



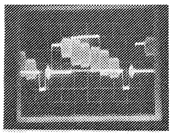
V: 0.1V/div.
H: 10μs/div.
E-7

⑮ IC201, Pin ㉔



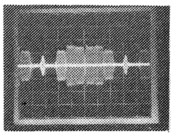
V: 0.1V/div.
H: 10μs/div.
B-10

⑯ TP203



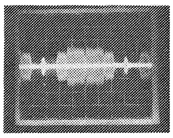
V: 0.5V/div.
H: 10μs/div.
B-9

⑰ IC201, Pin ㉙



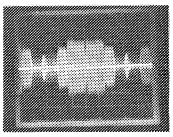
V: 0.1V/div.
H: 10μs/div.
B-9

⑱ IC401, Pin ⑳



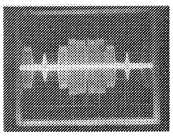
V: 0.05V/div.
H: 10μs/div.
D-15

⑲ IC401, Pin ㉖



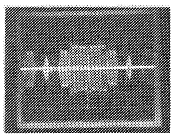
V: 0.2V/div.
H: 10μs/div.
D-14

⑳ IC401, Pin ㉘



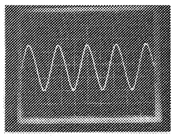
V: 0.02V/div.
H: 10μs/div.
D-14

㉑ IC401, Pin ㉚



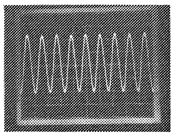
V: 0.2V/div.
H: 10μs/div.
D-14

㉒ TP211



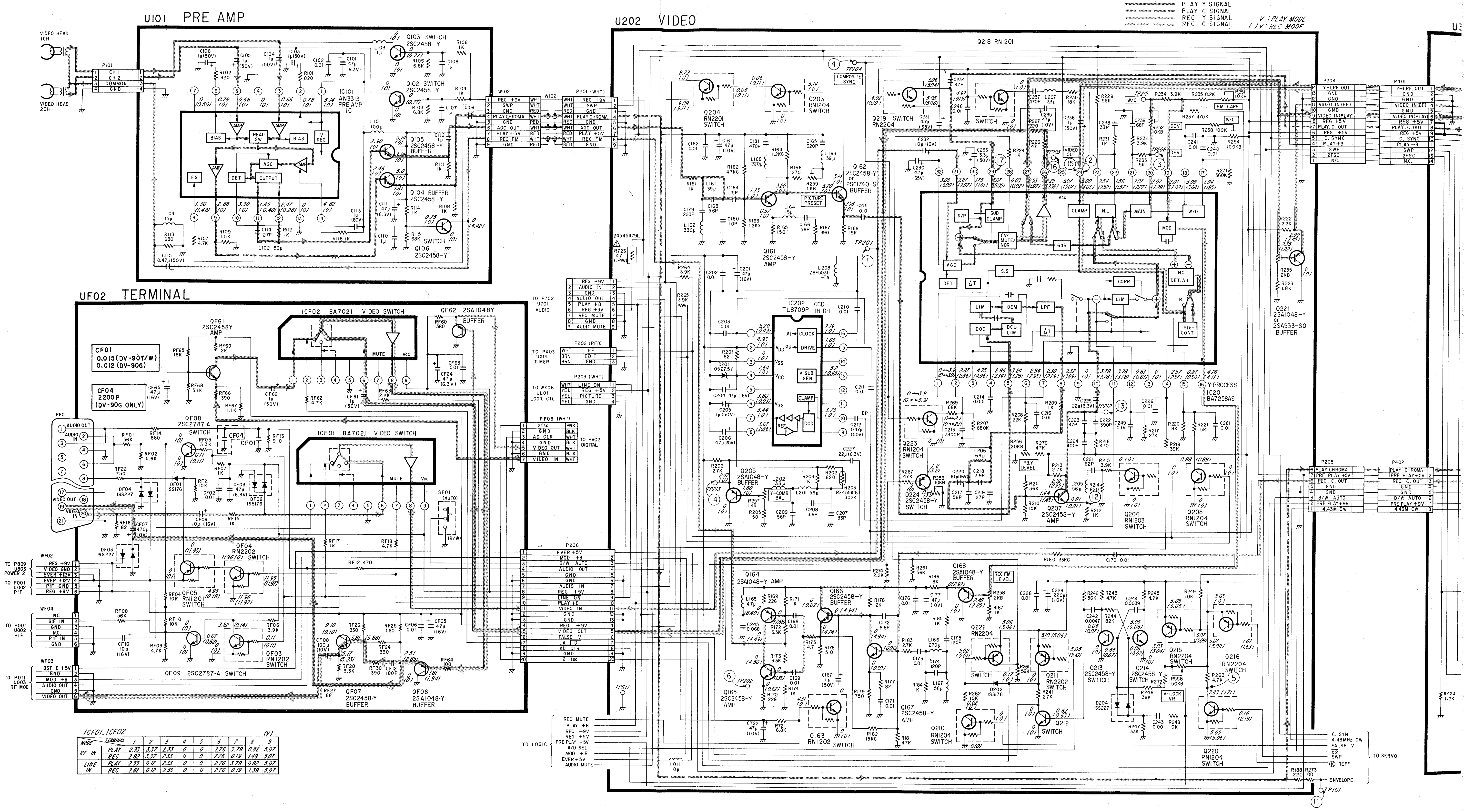
V: 0.1V/div.
H: 0.1μs/div.
G-13

㉓ Q407, Emitter



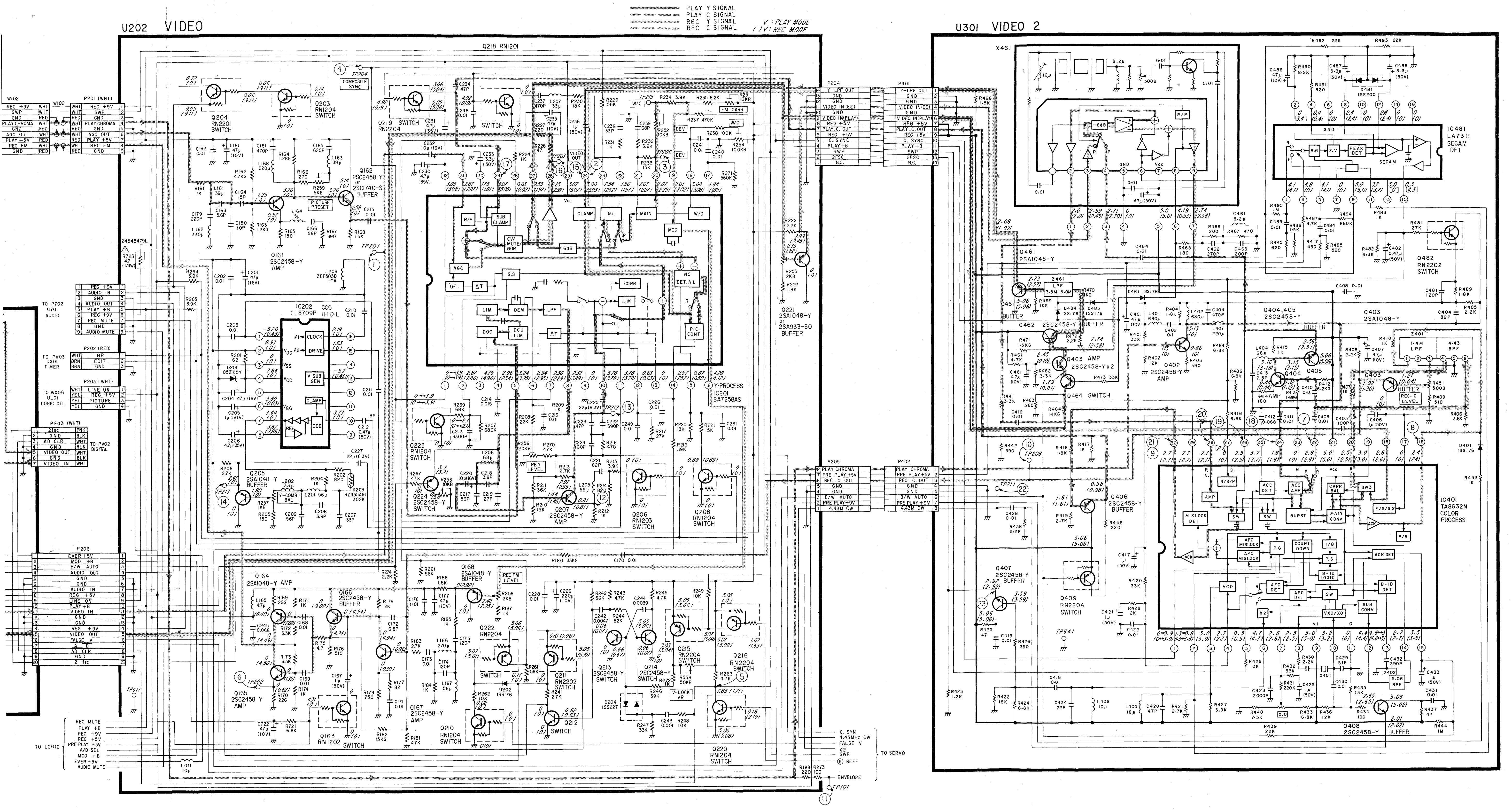
V: 0.1V/div.
H: 0.1μs/div.
E-13

12-3. Video, Video 2, Pre Amp, Terminal Circuit

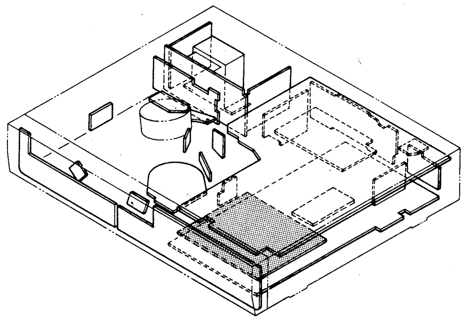

A
B
C
D
E
F
G
PLAY Y SIGNAL
PLAY C SIGNAL
REC Y SIGNAL
REC C SIGNAL
V : PLAY MODE
( ) V : REC MODE
U101 PRE AMP
VIDEO HEAD 1CH
VIDEO HEAD 2CH
P101
CH 1
CH 2
COMMON
GND
IC101 AN3313 PRE AMP IC
BIAS
HEAD SW
V REG
AMP
AGC
DET
OUTPUT
FG
Q103 SWITCH 2SC2458-Y
Q102 SWITCH 2SC2458-Y
Q105 2SC2458-Y BUFFER
Q104 BUFFER 2SC2458-Y
Q106 SWITCH 2SC2458-Y
W102
REC +9V
SWP
GND
PLAY CHROMA
GND
AGC OUT
PLAY +5V
REC FM
GND
P201 (WHT)
U202 VIDEO
Q218 RN1201
Q204 RN2201 SWITCH
Q203 RN1204 SWITCH
TP204 COMPOSITE SYNC
Q219 SWITCH RN2204
SWITCH
Q162 2SC2458-Y or 2SC1740-S BUFFER
Q161 2SC2458-Y AMP
PICTURE PRESET
IC202 TL8709P CCD 1H D·L
CLOCK
DRIVE
V SUB GEN
CLAMP
CCD
REF
L208 ZBF5030-TA
R/P
SUB CLAMP
CV/MUTE/NOR
CLAMP
N.L
MAIN
W/D
MOD
AGC
DET
S.S
6dB
CORR
LIM
DEM
LPF
DOC
DCU LIM
NC DET. AIL
PIC-CONT
IC201 BA7258AS
Y-PROCESS
W/C
FM CARR
DEV
Q221 2SA1048-Y or 2SA933-SQ BUFFER
P204
Y-LPF OUT
GND
VIDEO IN (EE)
VIDEO IN (PLAY)
REG +5V
PLAY C. OUT
C. SYNC
PLAY +B
SWP
2FSC
N.C.
P401
Q223 RN1204 SWITCH
Q224 2SC2458-Y SWITCH
Q205 2SA1048-Y BUFFER
Y-COMB BAL
RZ455A1G
PB.Y LEVEL
Q207 2SC2458-Y AMP
Q206 RN1203 SWITCH
Q208 RN1204 SWITCH
P205
PLAY CHROMA
PRE PLAY +5V
REC. C. OUT
GND
B/W AUTO
PRE PLAY +9V
4.43M CW
P402
Q164 2SA1048-Y AMP
Q166 2SC2458-Y BUFFER
Q168 2SA1048-Y BUFFER
REC FM LEVEL
Q165 2SC2458-Y AMP
Q163 RN1202 SWITCH
Q167 2SC2458-Y AMP
Q222 RN2204 SWITCH
Q210 RN1204 SWITCH
Q211 RN2202 SWITCH
Q212 SWITCH
Q213 2SC2458-Y SWITCH
Q214 2SC2458-Y SWITCH
Q215 RN2204 SWITCH
Q216 RN2204 SWITCH
Q220 RN1204 SWITCH
V-LOCK VR
D202 1SS176
D204 1SS227
TO LOGIC
REC MUTE
PLAY +B
REC +9V
REG +5V
PRE PLAY +5V
A/D SEL
MOD +B
EVER +5V
AUDIO MUTE
C. SYN
4.43MHz CW
FALSE V
X2
SWP
REFF
TO SERVO
ENVELOPE
TP101
TO P702 U701 AUDIO
REG +9V
AUDIO IN
GND
AUDIO OUT
PLAY +B
REC MUTE
AUDIO MUTE
TO PX03 UX01 TIMER
P202 (RED)
HP
EDIT
TO WX06 UL01 LOGIC CTL
P203 (WHT)
LINE ON
PICTURE
PF03 (WHT)
2fsc
AD CLR
VIDEO OUT
VIDEO IN
TO PV02 DIGITAL
P206
EVER +5V
MOD +B
B/W AUTO
AUDIO OUT
AUDIO IN
REG +5V
LINE ON
PLAY +B
VIDEO IN
REG +9V
VIDEO OUT
FALSE V
AD CLR
A D
2 fsc
UF02 TERMINAL
CF01 0.015 (DV-90T/W) 0.012 (DV-90G)
CF04 2200P (DV-90G ONLY)
ICF02 BA7021 VIDEO SWITCH
ICF01 BA7021 VIDEO SWITCH
MUTE
Vcc
QF61 2SC2458Y AMP
QF62 2SA1048Y BUFFER
PF01
AUDIO OUT
AUDIO IN
VIDEO OUT
VIDEO IN
QF08 2SC2787-A SWITCH
DF04 1SS227
DF01 1SS176
DF02 1SS176
DF03 1SS227
SF01 (AUTO) (B/W)
QF04 RN2202 SWITCH
QF05 RN1201 SWITCH
QF03 RN1202 SWITCH
QF07 2SC2458-Y BUFFER
QF06 2SA1048-Y BUFFER
QF09 2SC2787-A SWITCH
WF02 TO P809 U803 POWER 2
REG +9V
VIDEO GND
EVER +12V
EVER +12V
PIF GND
REG +9V
TO P001 U002 PIF
WF04
N.C.
SIF IN
GND
N.C.
PIF IN
GND
WF03 TO P011 U003 RF MOD
BST E +5V
GND
MOD +B
AUDIO OUT
GND
VIDEO OUT
24545479L
U3

ICF01, ICF02 (V)

MODE		1	2	3	4	5	6	7	8	9
RF IN	PLAY	2.33	3.37	2.33	0	0	2.76	3.79	0.82	5.07
	REC	2.82	3.37	2.33	0	0	2.76	0.19	1.49	5.07
LINE IN	PLAY	2.33	0.12	2.33	0	0	2.76	3.79	0.82	5.07
	REC	2.82	0.12	2.33	0	0	2.76	0.19	1.39	5.07


PLAY Y SIGNAL
PLAY C SIGNAL
REC Y SIGNAL
REC C SIGNAL
V : PLAY MODE
( ) V : REC MODE
U202 VIDEO
U301 VIDEO 2
Q218 RN1201
W102
P201 (WHT)
REC +9V
SWP
GND
PLAY CHROMA
AGC OUT
PLAY +5V
REC FM
Q204 RN2201 SWITCH
Q203 RN1204 SWITCH
Q219 RN2204 SWITCH
Q162 2SC2458-Y or 2SC1740-S BUFFER
Q161 2SC2458-Y AMP
PICTURE PRESET
COMPOSITE SYNC
TP204
TP201
TP203
VIDEO OUT
W/C
FM CARR
DEV
CLAMP
N.L
MAIN
W/D
MOD
R/P
SUB CLAMP
CV/MUTE/NOR
6dB
AGC
DET
ΔT
S.S
CORR
LIM
DEM
LPF
DOC
DCU LIM
NC DET.AIL
PIC-CONT
IC201 BA7258AS Y-PROCESS
IC202 TL8709P CCD 1H D-L
CLOCK
DRIVE
V SUB GEN
CCD
REF
TO P702 U701 AUDIO
REG +9V
AUDIO IN
AUDIO OUT
PLAY +B
REC MUTE
AUDIO MUTE
TO PX03 UX01 TIMER
P202 (RED)
HP
EDIT
P203 (WHT)
TO WX06 UL01 LOGIC CTL
LINE ON
PICTURE
PF03 (WHT)
TO PV02 DIGITAL
2fsc
VIDEO OUT
VIDEO IN
Q205 2SA1048-Y BUFFER
Y-COMB BAL
TP213
Q223 RN1204 SWITCH
Q224 2SC2458-Y SWITCH
Q207 2SC2458-Y AMP
PBY LEVEL
Q206 RN1203 SWITCH
Q208 RN1204 SWITCH
Q221 2SA1048-Y or 2SA933-SQ BUFFER
P204
Y-LPF OUT
VIDEO IN (EE)
VIDEO IN (PLAY)
REG +5V
PLAY C OUT
C. SYNC
PLAY +B
SWP
2FSC
N.C.
P401
P206
EVER +5V
MOD +B
B/W AUTO
AUDIO OUT
AUDIO IN
REG +5V
LINE ON
VIDEO IN
REG +9V
VIDEO OUT
FALSE V
A/D CLR
2 fsc
Q164 2SA1048-Y AMP
Q166 2SC2458-Y BUFFER
Q168 2SA1048-Y BUFFER
REC FM LEVEL
Q165 2SC2458-Y AMP
TP202
Q163 RN1202 SWITCH
Q167 2SC2458-Y AMP
Q210 RN1204 SWITCH
Q222 RN2204 SWITCH
D202 1SS176
Q211 RN2202 SWITCH
Q212 SWITCH
Q213 2SC2458-Y SWITCH
Q214 2SC2458-Y SWITCH
D204 1SS227
Q215 RN2204 SWITCH
V-LOCK VR
Q216 RN2204 SWITCH
Q220 RN1204 SWITCH
TO LOGIC
REC MUTE
PLAY +B
REC +9V
REG +5V
X2
A/D SEL
MOD +B
EVER +5V
AUDIO MUTE
C. SYN
4.43MHz CW
FALSE V
X2
SWP
REFF
TO SERVO
ENVELOPE
TP101
P205
P402
PLAY CHROMA
PRE PLAY +5V
REC C OUT
B/W AUTO
PRE PLAY +9V
4.43M CW
X461
-6dB
Q461 2SA1048-Y BUFFER
Z461 LPF 3.5M 3.0M
D484 1SS176
D483 1SS176
D461 1SS176
Q462 2SC2458-Y BUFFER
Q463 AMP 2SC2458-Y x2
Q464 SWITCH
Q402 2SC2458-Y AMP
IC481 LA7311 SECAM DET
B-G
F-V
PEAK DET
SECAM
D481 1SS200
Q482 RN2202 SWITCH
Q404,405 2SC2458-Y BUFFER
Q403 2SA1048-Y
Q404 AMP
Q405
Z401
1-4M LPF
4-43 BPF
Q403 BUFFER
REC-C LEVEL
D401 1SS176
TP208
TP211
Q406 2SC2458-Y BUFFER
Q407 2SC2458-Y BUFFER
Q409 RN2204 SWITCH
TP41
IC401 TA8632N COLOR PROCESS
N/S/P
AMP
ACC DET
ACC AMP
CARR BAL
SW3
E/S/S.S
MISLOCK DET
SW
BURST
MAIN CONV
ACK
P/R
AFC MISLOCK
APC MISLOCK
P.G
COUNT DOWN
1/8
ACK DET
P.S
B-ID LOGIC
B-ID DET
VCO
AFC DET
APC DET
VXO/XO
SUB CONV
X2
X401
Z402 BPF
Q408 2SC2458-Y BUFFER

13-1. Digital PC Board



Voltage and Location of Transistors

V : EE MODE
(V): EE STILC MODE

Symbol No.	Votage (Unit:V)			Location
	E	C	B	
QV21	1.86(1.85)	0(0)	1.19(1.19)	C-3
QV22	3.88(3.89)	3.29(3.26)	3.29(3.26)	D-2
QV23	3.96(3.92)	0(0)	3.29(3.26)	D-2
QV24	(1.20)	0(0)	(0.53)	C-3
QV25	(0.53)	(4.07)	(1.25)	C-4
QV26	(3.90)	(1.25)	3.29(3.26)	D-3
QV27	0(0)	–	0(0.05)	D-3
QV28	0(0.05)	4.86(4.90)	0(0.05)	D-3
QV29	1.26(1.25)	4.93(4.88)	1.97(1.95)	E-2
QV30	2.6(2.6)	4.93(4.89)	3.42(3.40)	E-3

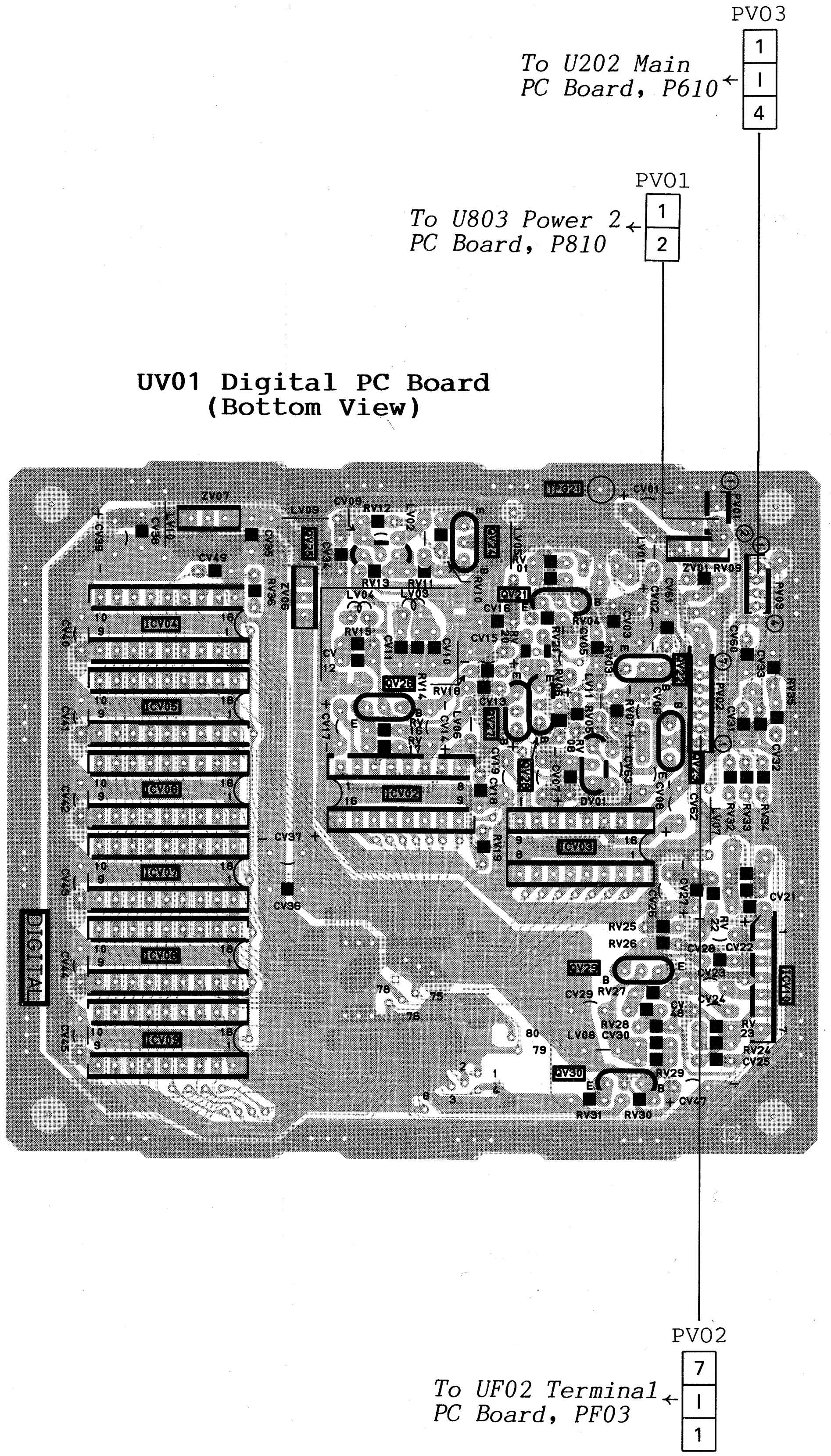
Location of IC's

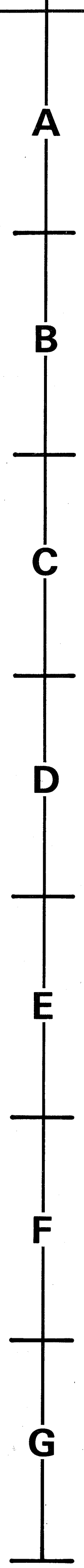
Symbol No.	Location
ICV01	E-2
ICV02	D-3
ICV03	D-3
ICV04	C-4
ICV05	D-4
ICV06	D-4
ICV07	E-4
ICV08	E-4
ICV09	E-4
ICV10	E-2

Location of Diode

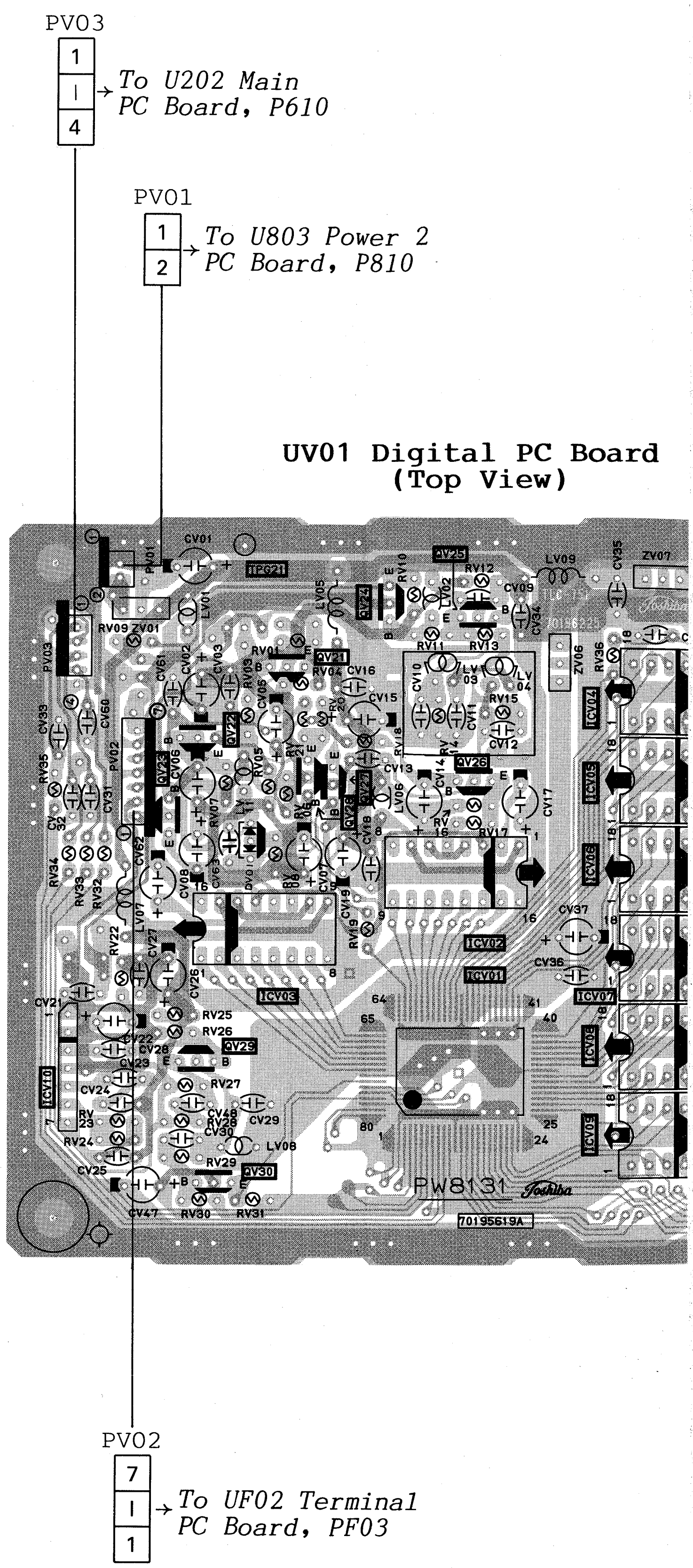
Symbol No.	Location
DV01	D-2

UV01 Digital PC Board
(Bottom View)


8
7
6
5
4
3
2
1
PV03
1
4
To U202 Main PC Board, P610
PV01
1
2
To U803 Power 2 PC Board, P810
DIGITAL
ICV04
ICV05
ICV06
ICV07
ICV08
ICV09
ICV02
ICV03
ICV01
ICV10
PV02
7
1
To UF02 Terminal PC Board, PF03



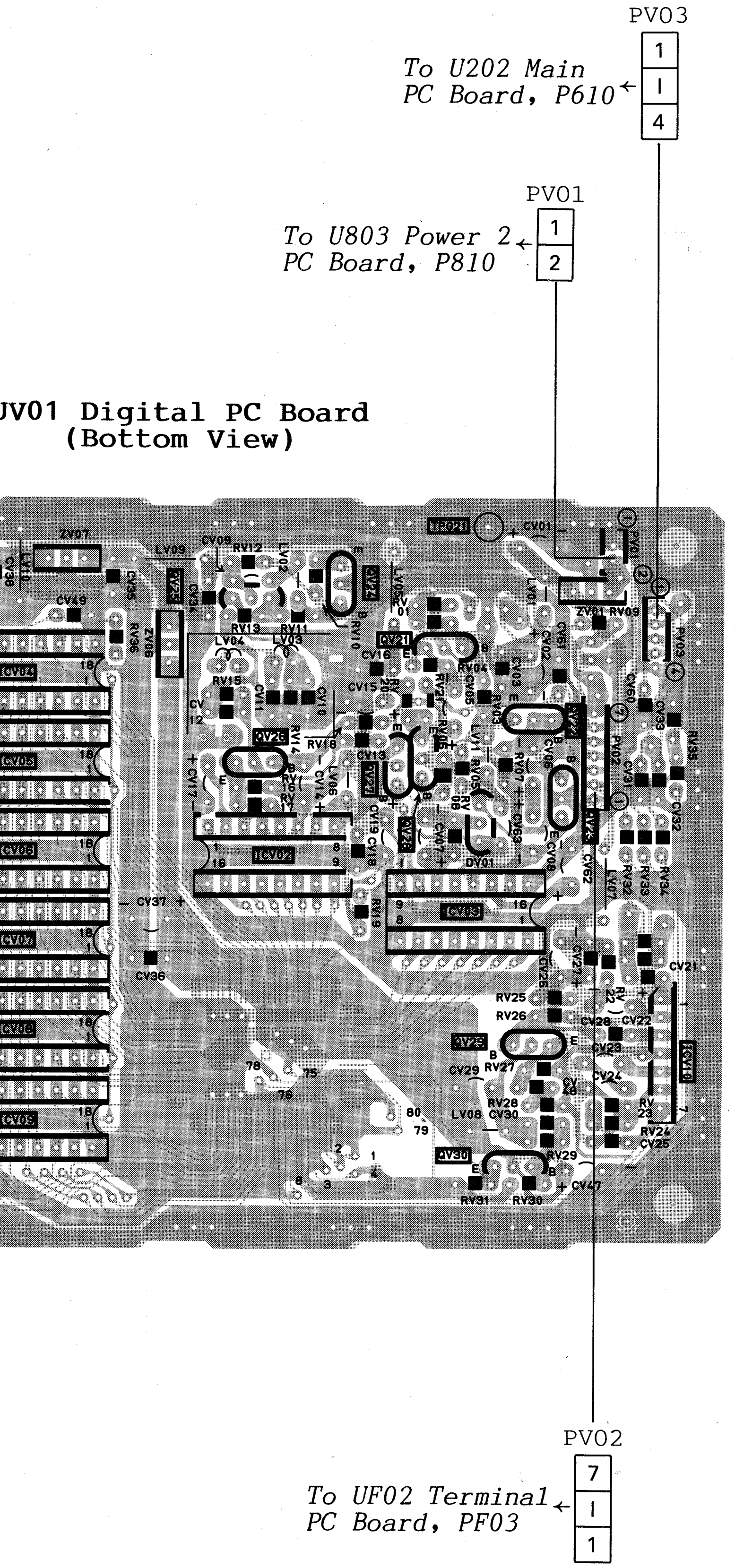
UV01 Digital PC Board
(Top View)


1
2
3
4
PV03
1
4
To U202 Main PC Board, P610
PV01
1
2
To U803 Power 2 PC Board, P810
PW8131
TOSHIBA
70195619A
PV02
7
1
To UF02 Terminal PC Board, PF03

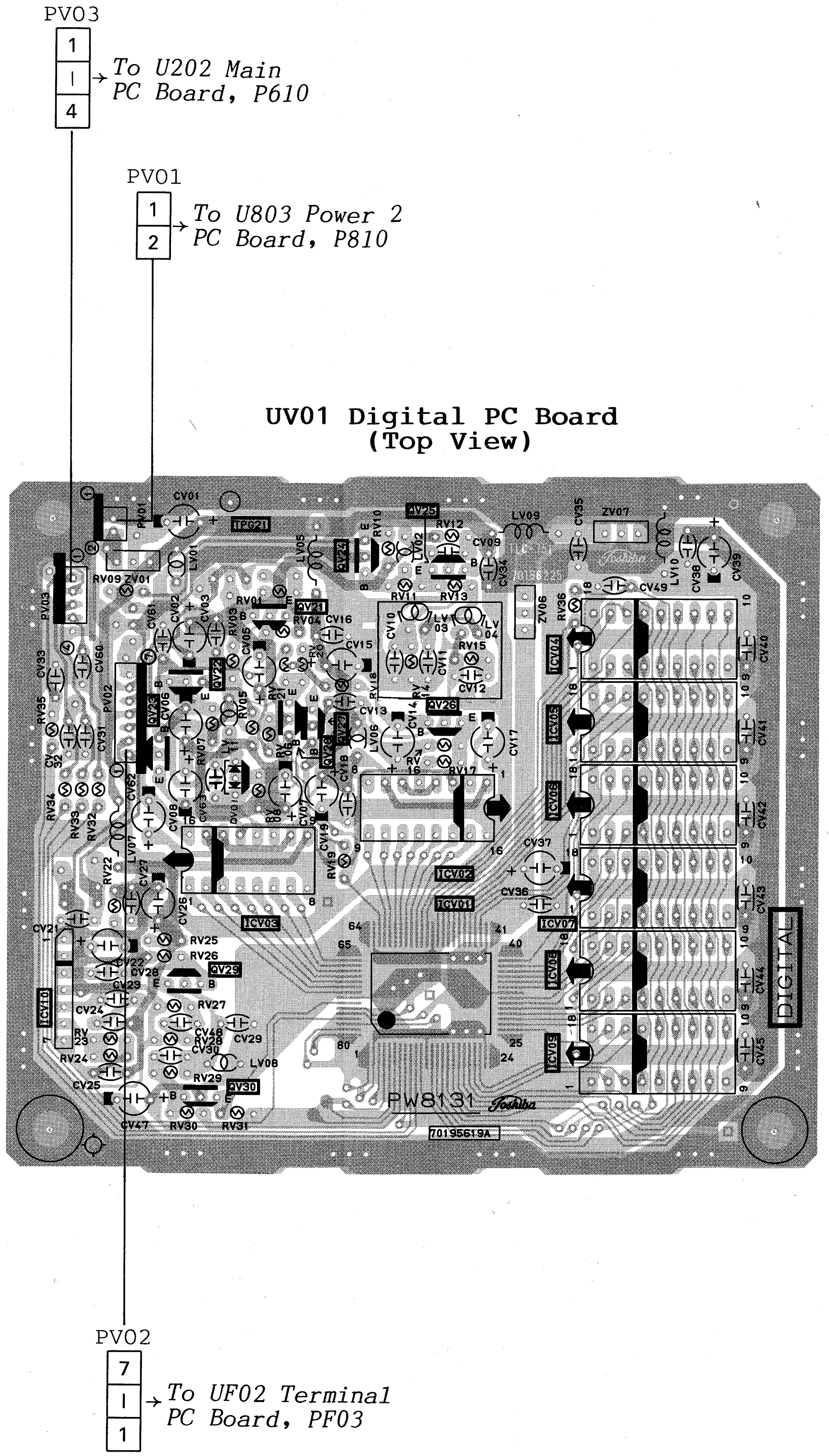
4 3 2 1 1 2 3 4 5 6 7 8

A B C D E F G

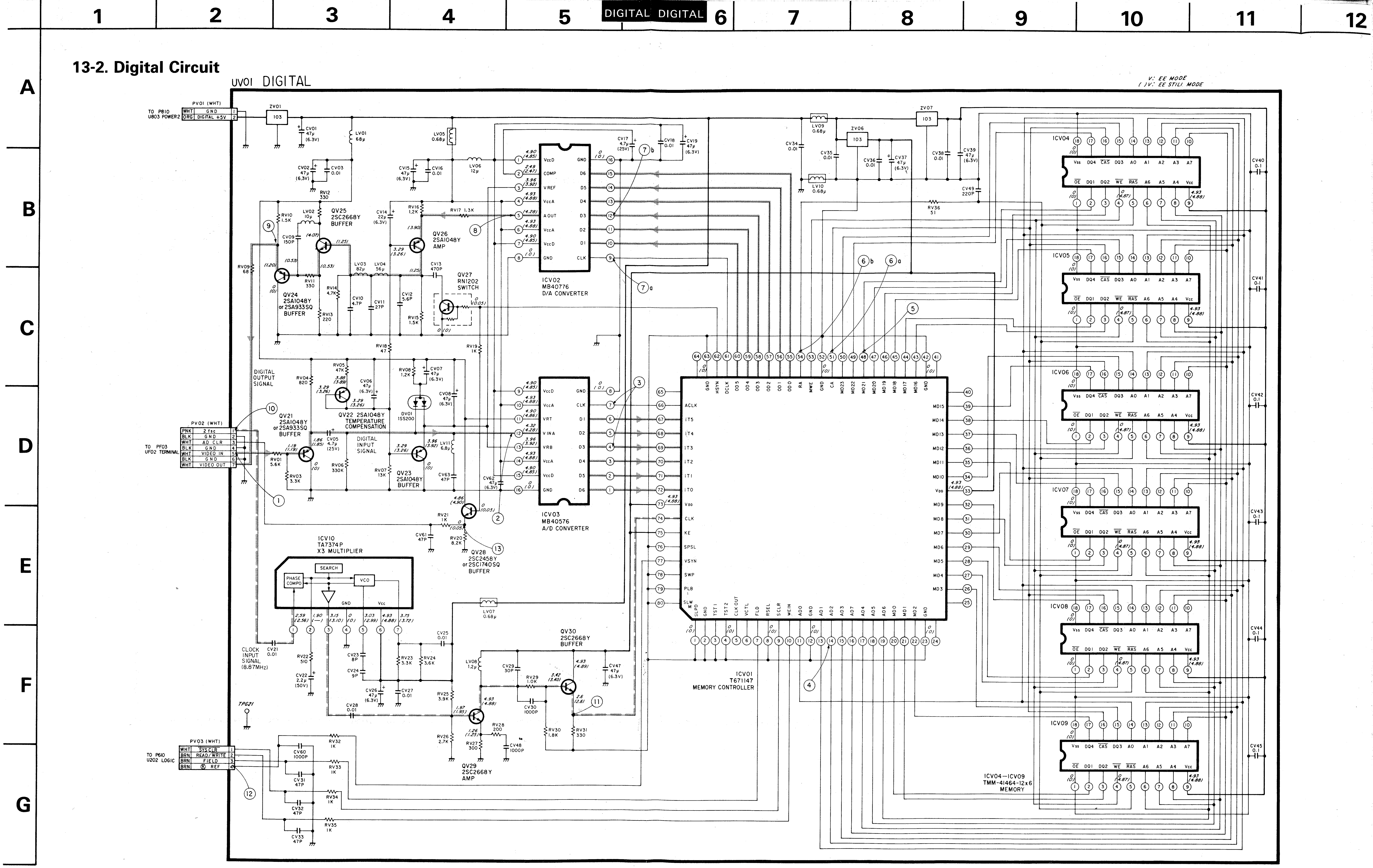
UV01 Digital PC Board
(Bottom View)


PV03
1
|
4
To U202 Main PC Board, P610
PV01
1
2
To U803 Power 2 PC Board, P810
PV02
7
|
1
To UF02 Terminal PC Board, PF03
TP621

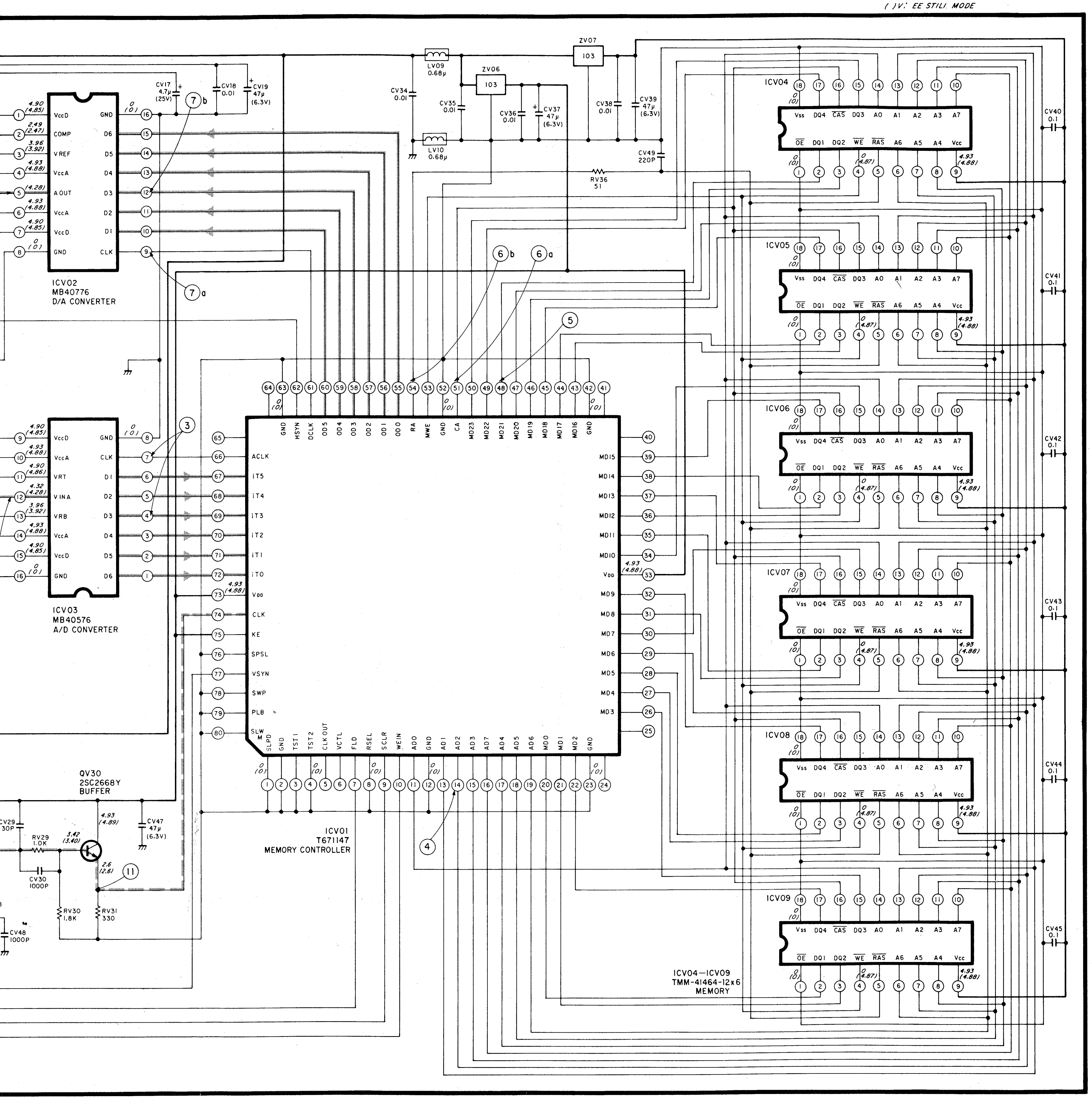
UV01 Digital PC Board
(Top View)


PV03
1
|
4
To U202 Main PC Board, P610
PV01
1
2
To U803 Power 2 PC Board, P810
PV02
7
|
1
To UF02 Terminal PC Board, PF03
TP621
DIGITAL
PW8131
Toshiba
70195619A

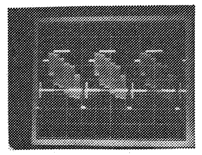
13-2. Digital Circuit


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
UV01 DIGITAL
V: EE MODE
( )V: EE STILL MODE
TO P810 U803 POWER2
PV01 (WHT)
WHT GND
ORG DIGITAL +5V
ZV01 103
CV01 47μ (6.3V)
LV01 68μ
CV02 47μ (6.3V)
CV03 0.01
RV12 330
QV25 2SC2668Y BUFFER
LV02 10μ
RV10 1.5K
CV09 150P
RV11 330
RV09 68
QV24 2SA1048Y or 2SA933SQ BUFFER
RV13 220
RV14 4.7K
LV03 82μ
LV04 56μ
CV10 4.7P
CV11 27P
CV12 5.6P
RV15 1.5K
CV13 470P
QV27 RN1202 SWITCH
LV05 0.68μ
CV15 47μ (6.3V)
CV16 0.01
LV06 12μ
CV14 22μ (6.3V)
RV16 1.2K
RV17 1.3K
QV26 2SA1048Y AMP
ICV02 MB40776 D/A CONVERTER
VccD
COMP
VREF
VccA
AOUT
GND
D6
D5
D4
D3
D2
D1
CLK
CV17 4.7μ (25V)
CV18 0.01
CV19 47μ (6.3V)
RV18 47
RV19 1K
DIGITAL OUTPUT SIGNAL
RV04 820
RV05 47K
CV06 47μ (6.3V)
QV22 2SA1048Y TEMPERATURE COMPENSATION
RV08 1.2K
CV07 47μ (6.3V)
CV08 47μ (6.3V)
DV01 1SS200
TO PF03 UF02 TERMINAL
PV02 (WHT)
PNK 2 fsc
BLK GND
WHT AO CLR
BLK GND
WHT VIDEO IN
BLK GND
WHT VIDEO OUT
QV21 2SA1048Y or 2SA933SQ BUFFER
RV01 5.6K
RV03 3.3K
CV05 4.7μ (25V)
DIGITAL INPUT SIGNAL
RV06 330K
RV07 13K
QV23 2SA1048Y BUFFER
LV11 6.8μ
CV63 47P
CV62 47μ (6.3V)
ICV03 MB40576 A/D CONVERTER
VRT
VINA
VRB
CLK
RV21 1K
CV61 47P
RV20 8.2K
QV28 2SC2458Y or 2SC1740SQ BUFFER
ICV10 TA7374P X3 MULTIPLIER
SEARCH
PHASE COMPO
VCO
Vcc
LV07 0.68μ
CLOCK INPUT SIGNAL (8.87MHz)
CV21 0.01
RV22 510
CV22 2.2μ (50V)
CV23 8P
CV24 9P
CV25 0.01
RV23 3.3K
RV24 3.6K
CV26 47μ (6.3V)
CV27 0.01
CV28 0.01
QV30 2SC2668Y BUFFER
LV08 1.2μ
CV29 30P
RV29 1.0K
CV30 1000P
CV47 47μ (6.3V)
RV25 3.9K
RV26 2.7K
RV27 300
RV28 200
CV48 1000P
RV30 1.8K
RV31 330
QV29 2SC2668Y AMP
TPG21
TO P610 U202 LOGIC
PV03 (WHT)
WHT SYSCLR
BRN READ/WRITE
BRN FIELD
BRN REF
CV60 1000P
RV32 1K
CV31 47P
RV33 1K
CV32 47P
RV34 1K
CV33 47P
RV35 1K
ICV01 T671147 MEMORY CONTROLLER
ACLK
IT5
IT4
IT3
IT2
IT1
IT0
VDD
CLK
KE
SPSL
VSYN
SWP
PLB
SLWM
HSYN
DCLK
OD5
OD4
OD3
OD2
OD1
OD0
RA
MWE
CA
MD23
MD22
MD21
MD20
MD19
MD18
MD17
MD16
MD15
MD14
MD13
MD12
MD11
MD10
MD9
MD8
MD7
MD6
MD5
MD4
MD3
SLPD
TST1
TST2
CLK OUT
VCTL
FLD
RSEL
SCLR
WEIN
AD0
AD1
AD2
AD3
AD7
AD4
AD5
AD6
MD0
MD1
MD2
LV09 0.68μ
LV10 0.68μ
CV34 0.01
CV35 0.01
ZV06 103
CV36 0.01
CV37 47μ (6.3V)
ZV07 103
CV38 0.01
CV39 47μ (6.3V)
CV49 220P
RV36 51
ICV04
ICV05
ICV06
ICV07
ICV08
ICV09
Vss DQ4 CAS DQ3 A0 A1 A2 A3 A7
OE DQ1 DQ2 WE RAS A6 A5 A4 Vcc
CV40 0.1
CV41 0.1
CV42 0.1
CV43 0.1
CV44 0.1
CV45 0.1
ICV04—ICV09 TMM-41464-12x6 MEMORY

V: EE MODE
( )V: EE STILL MODE

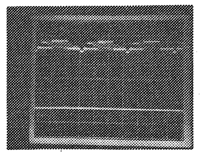

ICV02
MB40776
D/A CONVERTER
VccD COMP VREF VccA AOUT VccA VccD GND
GND D6 D5 D4 D3 D2 D1 CLK
4.90 (4.85)
2.49 (2.47)
3.96 (3.92)
4.93 (4.88)
(4.28)
4.93 (4.88)
4.90 (4.85)
0 (0)
ICV03
MB40576
A/D CONVERTER
VccD VccA VRT VINA VRB VccA VccD GND
GND CLK D1 D2 D3 D4 D5 D6
4.90 (4.85)
4.93 (4.88)
4.90 (4.86)
4.32 (4.28)
3.96 (3.92)
4.93 (4.88)
4.90 (4.85)
0 (0)
CV17 4.7μ (25V)
CV18 0.01
CV19 47μ (6.3V)
CV34 0.01
LV09 0.68μ
LV10 0.68μ
CV35 0.01
ZV06 103
CV36 0.01
CV37 47μ (6.3V)
ZV07 103
CV38 0.01
CV39 47μ (6.3V)
CV49 220P
RV36 51
ICV01
T671147
MEMORY CONTROLLER
GND HSYN DCLK DO5 DO4 DO3 DO2 DO1 DO0 RA MWE GND CA MD23 MD22 MD21 MD20 MD19 MD18 MD17 MD16 GND
ACLK IT5 IT4 IT3 IT2 IT1 IT0 VDD CLK KE SPSL VSYN SWP PL8 SLWM
SLPD GND TST1 TST2 CLK OUT VCTL FLD RSEL SCLR WEIN AD0 GND AD1 AD2 AD3 AD7 AD4 AD5 AD6 MD0 MD1 MD2 GND
MD15 MD14 MD13 MD12 MD11 MD10 VDD MD9 MD8 MD7 MD6 MD5 MD4 MD3
4.93 (4.88)
ICV04 ICV05 ICV06 ICV07 ICV08 ICV09
Vss DQ4 CAS DQ3 A0 A1 A2 A3 A7
OE DQ1 DQ2 WE RAS A6 A5 A4 Vcc
0 (0)
0 (4.87)
4.93 (4.88)
CV40 0.1
CV41 0.1
CV42 0.1
CV43 0.1
CV44 0.1
CV45 0.1
ICV04—ICV09
TMM-41464-12x6
MEMORY
QV30
2SC2668Y
BUFFER
CV29 30P
RV29 1.0K
4.93 (4.89)
3.42 (3.40)
2.6 (2.61)
CV47 47μ (6.3V)
CV30 1000P
RV30 1.8K
RV31 330
CV48 1000P
① ② ③ ④ ⑤ ⑥a ⑥b ⑦a ⑦b ⑪

① PV02, Pin ⑤



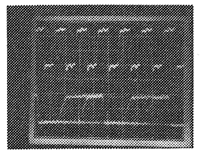
V: 0.5V/div.
H: 20μs/div.

② ICV03, Pin ⑫



V: 1.0V/div.
H: 20μs/div.

③ a: ICV03, Pin ⑦ b: ICV03, Pin ④

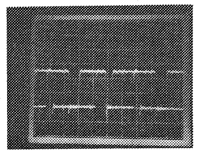


a

b

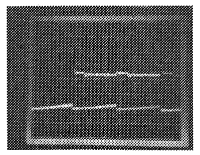
V: 2.0V/div.
H: 50ns/div.

④ ICV01, Pin ⑭



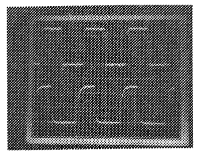
V: 2.0V/div.
H: 100ns/div.

⑤ ICV01, Pin (48)



V: 2.0V/div.
H: 100ns/div.

⑥ a: ICV01, Pin (51) b: ICV01, Pin (54)

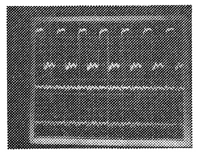


a

b

V: 2.0V/div.
H: 100ns/div.

⑦ a: ICV02, Pin ⑨ b: ICV02, Pin ⑫

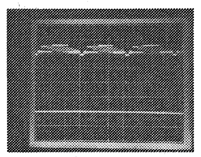


a

b

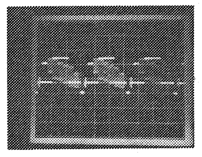
V: 2.0V/div.
H: 50ns/div.

⑧ ICV02, Pin ⑤



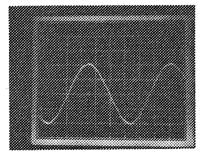
V: 1.0V/div.
H: 20μs/div.

⑨ QV24, Emitter



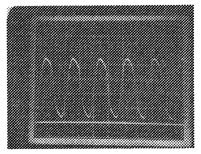
V: 200mV/div.
H: 20μs/div.

⑩ PV02, Pin ①



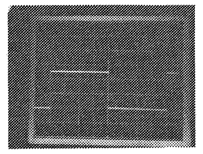
V: 200mV/div.
H: 20ns/div.

⑪ QV30, Emitter



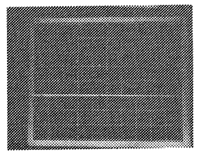
V: 1.0V/div.
H: 20ns/div.

⑫ PV03, Pin ④



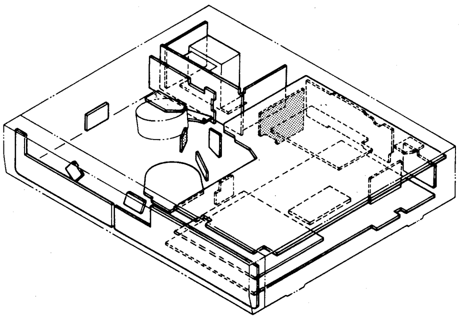
V: 2.0V/div.
H: 5ms/div.

⑬ QV28, Emitter



V: 2.0V/div.
H: 5ms/div.

14-2. Audio PC Board



Voltage and Location of Transistors

V : REC MODE

(V): PLAY MODE

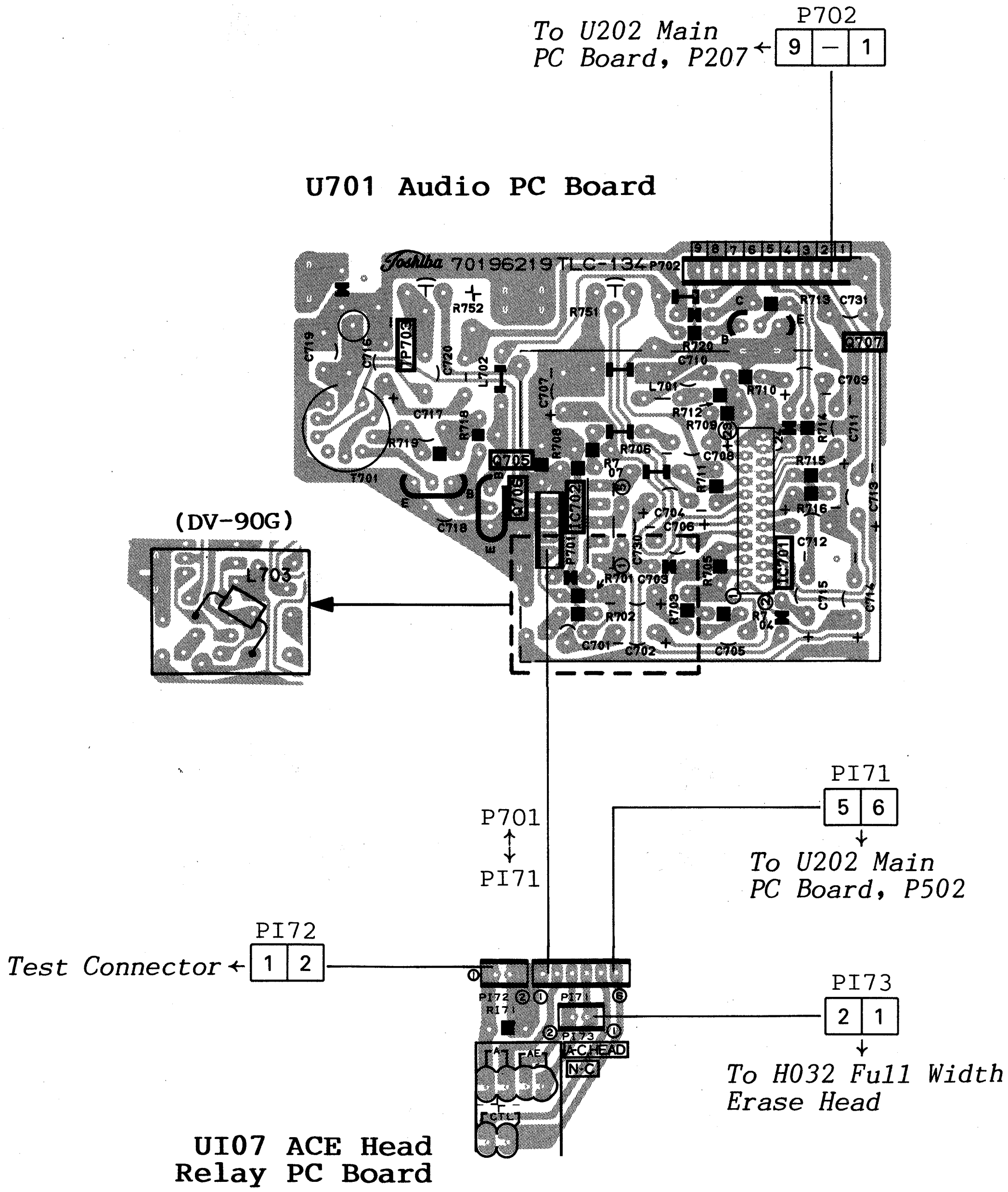
Symbol No.	Voltage (Unit:V)			Location
	E	C	B	
Q705	0(0)	8.3(0)	(-0.2)(0)	E-3
Q706	0(0)	0(0)	0(3.6)	E-3
Q707	0(0)	5.5(0)	0(2.4)	D-4

Location of IC's

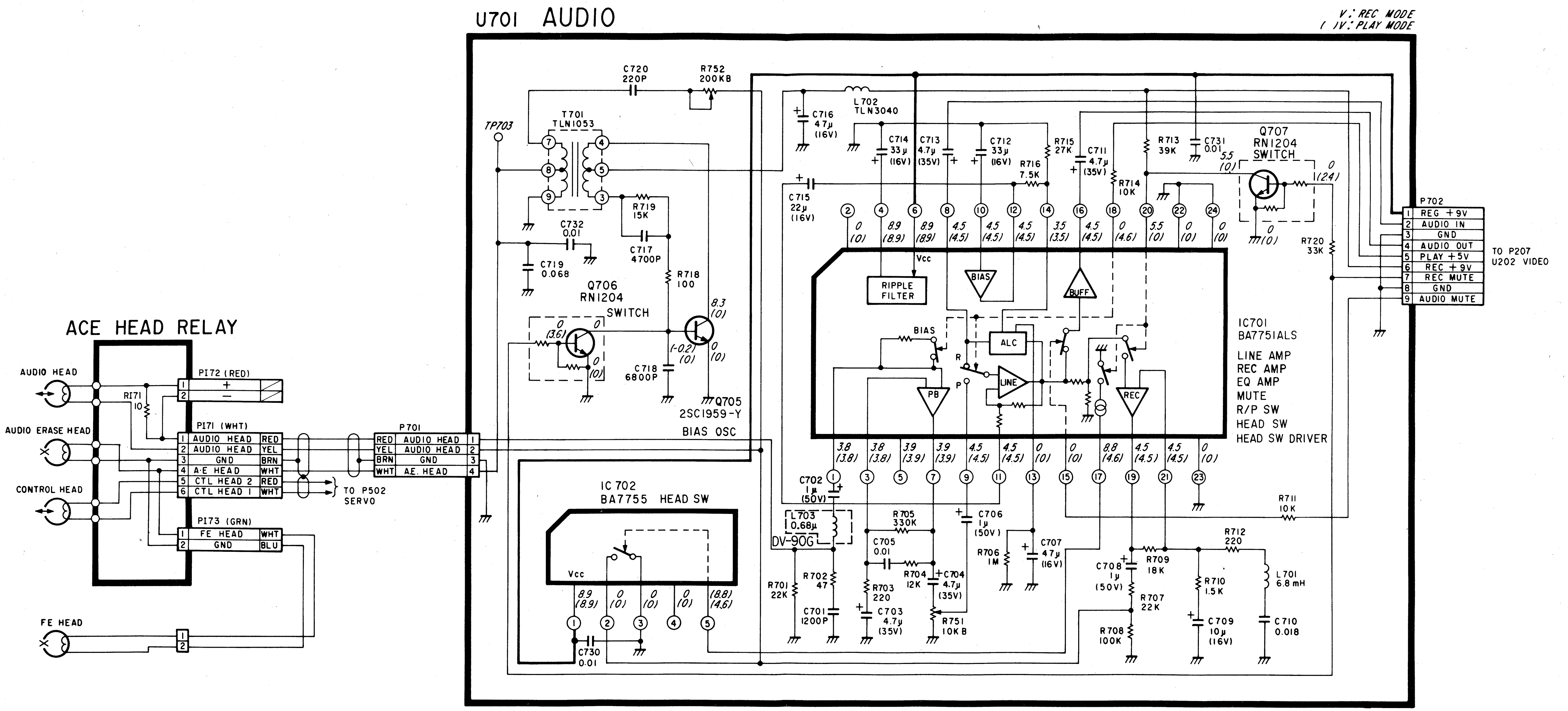
Symbol No.	Location
IC701	E-4
IC702	E-3

Location of Adjusting VR's

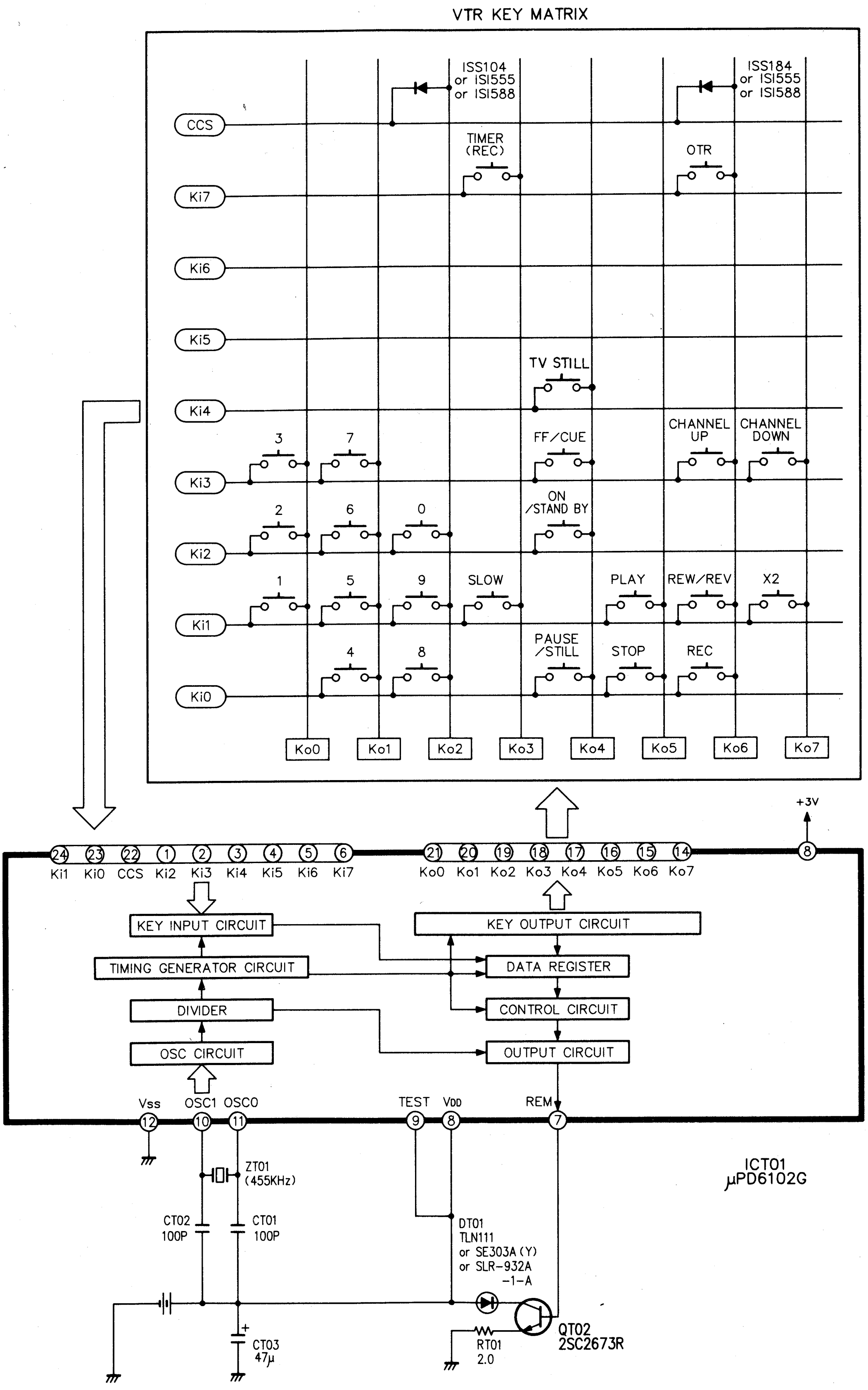
Symbol No.	Location
R751	D-3
R752	D-3


P702
To U202 Main PC Board, P207
9 — 1
U701 Audio PC Board
Toshiba 70196219 TLC-134 P702
9 8 7 6 5 4 3 2 1
R752
R751
R713
C731
Q707
TP703
C719
C716
C720
L702
C707
R720
C710
L701
R710
C709
C717
R718
R719
T701
R708
R712
R709
R714
C711
R706
R707
C708
R715
Q705
Q706
IC702
R711
R716
C713
C718
C704
C706
P701
C730
C712
IC701
R701
C703
R705
R703
R702
R704
C715
C714
C701
C702
C705
(DV-90G)
L703
P701
PI71
PI71
5 6
To U202 Main PC Board, P502
PI72
Test Connector
1 2
PI73
2 1
To H032 Full Width Erase Head
PI72
RI71
PI73
A-C HEAD
N-C
CTL
UI07 ACE Head Relay PC Board

14-3. Audio Circuit


U701 AUDIO
V : REC MODE
( )V : PLAY MODE
ACE HEAD RELAY
AUDIO HEAD
AUDIO ERASE HEAD
CONTROL HEAD
FE HEAD
R171 10
P172 (RED)
P171 (WHT)
P173 (GRN)
1 AUDIO HEAD RED
2 AUDIO HEAD YEL
3 GND BRN
4 A·E HEAD WHT
5 CTL HEAD 2 RED
6 CTL HEAD 1 WHT
TO P502 SERVO
1 FE HEAD WHT
2 GND BLU
P701
RED AUDIO HEAD 1
YEL AUDIO HEAD 2
BRN GND 3
WHT AE. HEAD 4
TP703
T701 TLN1053
C720 220P
R752 200KB
R719 15K
C732 0.01
C717 4700P
C719 0.068
R718 100
Q706 RN1204 SWITCH
C718 6800P
Q705 2SC1959-Y BIAS OSC
L702 TLN3040
C716 47µ (16V)
C715 22µ (16V)
C714 33µ (16V)
C713 4.7µ (35V)
C712 33µ (16V)
R715 27K
R716 7.5K
C711 4.7µ (35V)
R714 10K
R713 39K
C731 0.01
Q707 RN1204 SWITCH
R720 33K
P702
1 REG +9V
2 AUDIO IN
3 GND
4 AUDIO OUT
5 PLAY +5V
6 REC +9V
7 REC MUTE
8 GND
9 AUDIO MUTE
TO P207 U202 VIDEO
IC701 BA7751ALS
LINE AMP
REC AMP
EQ AMP
MUTE
R/P SW
HEAD SW
HEAD SW DRIVER
Vcc
RIPPLE FILTER
BIAS
BUFF
ALC
LINE
PB
REC
R
P
IC 702 BA7755 HEAD SW
C730 0.01
C702 1µ (50V)
L703 0.68µ DV-90G
R701 22K
R702 47
C701 1200P
R705 330K
C705 0.01
R703 220
R704 12K
C704 4.7µ (35V)
C703 4.7µ (35V)
R751 10K B
C706 1µ (50V)
R706 1M
C707 47µ (16V)
C708 1µ (50V)
R709 18K
R707 22K
R708 100K
R711 10K
R712 220
R710 1.5K
C709 10µ (16V)
L701 6.8 mH
C710 0.018

15. Remote Control Circuit


VTR KEY MATRIX
ISS104
or ISI555
or ISI588
ISS184
or ISI555
or ISI588
CCS
Ki7
Ki6
Ki5
Ki4
Ki3
Ki2
Ki1
Ki0
TIMER
(REC)
OTR
TV STILL
3
7
FF/CUE
CHANNEL
UP
CHANNEL
DOWN
2
6
0
ON
/STAND BY
1
5
9
SLOW
PLAY
REW/REV
X2
4
8
PAUSE
/STILL
STOP
REC
Ko0
Ko1
Ko2
Ko3
Ko4
Ko5
Ko6
Ko7
+3V
24
23
22
1
2
3
4
5
6
Ki1
Ki0
CCS
Ki2
Ki3
Ki4
Ki5
Ki6
Ki7
21
20
19
18
17
16
15
14
Ko0
Ko1
Ko2
Ko3
Ko4
Ko5
Ko6
Ko7
8
KEY INPUT CIRCUIT
TIMING GENERATOR CIRCUIT
DIVIDER
OSC CIRCUIT
KEY OUTPUT CIRCUIT
DATA REGISTER
CONTROL CIRCUIT
OUTPUT CIRCUIT
Vss
OSC1
OSCO
TEST
VDD
REM
12
10
11
9
8
7
ICT01
μPD6102G
ZT01
(455KHz)
CT02
100P
CT01
100P
DT01
TLN111
or SE303A (Y)
or SLR-932A
-1-A
+
CT03
47μ
RT01
2.0
QT02
2SC2673R

SECTION 4
PARTS LIST

SAFETY PRECAUTION

The parts identified by ⚠ mark are critical for safety. Replace only with part number specified.
The mounting position of replacement is to be identical with originals. The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.

* : DV-90G only.
X : DV-90W only.

ABBREVIATIONS

1. Integrated circuit (IC)

2. Capacitor (Cap)

   MF . . . . . . microfarad
   PF . . . . . . picofarad (micro-microfarad)

3. Resistor (Res)

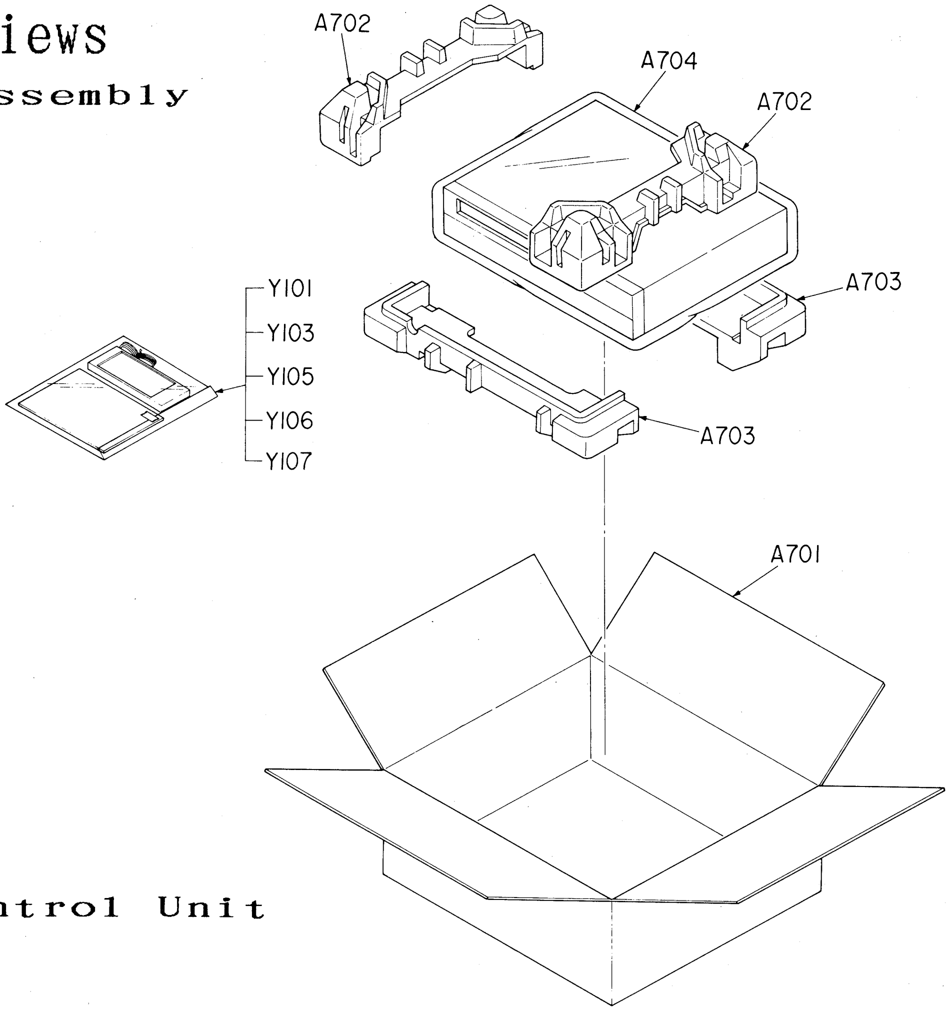
   All resistance values are in ohms.
   K . . . . . . Kilo (1000)
   M . . . . . . Mega (1000000)
   W . . . . . . Watt

4. Tolerance

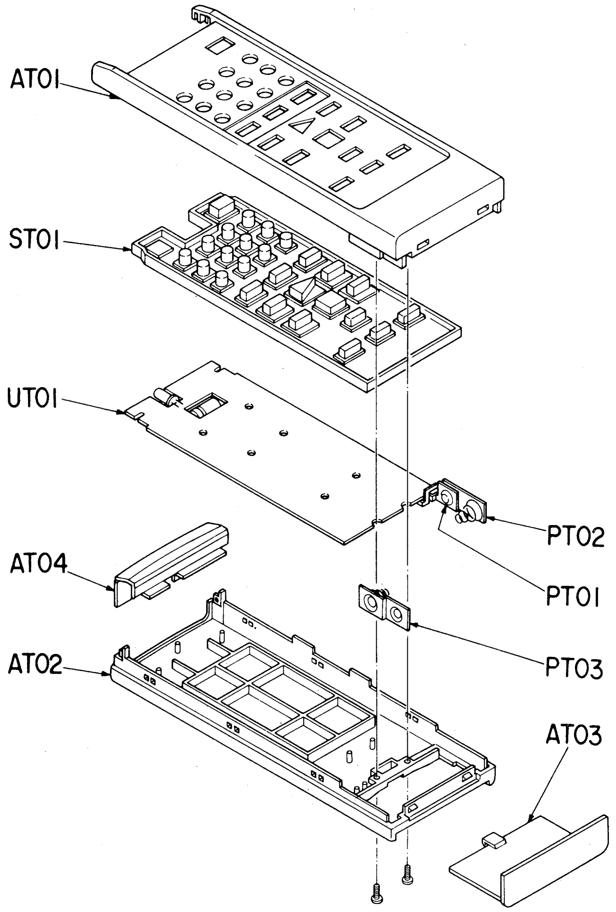
Symbol	F	G	J	K	M	N	Z	P	A
%	±1	±2	±5	±10	±20	±30	+80 -20	+100 -0	+100 -10

1. Exploded Views

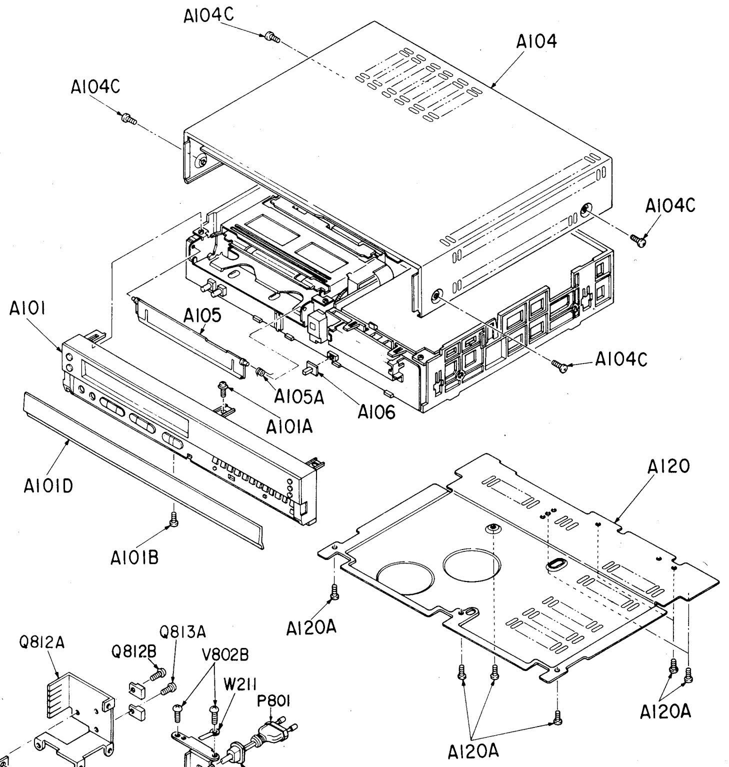
(1) Packing Assembly


A702
A704
A702
Y101
Y103
Y105
Y106
Y107
A703
A703
A701

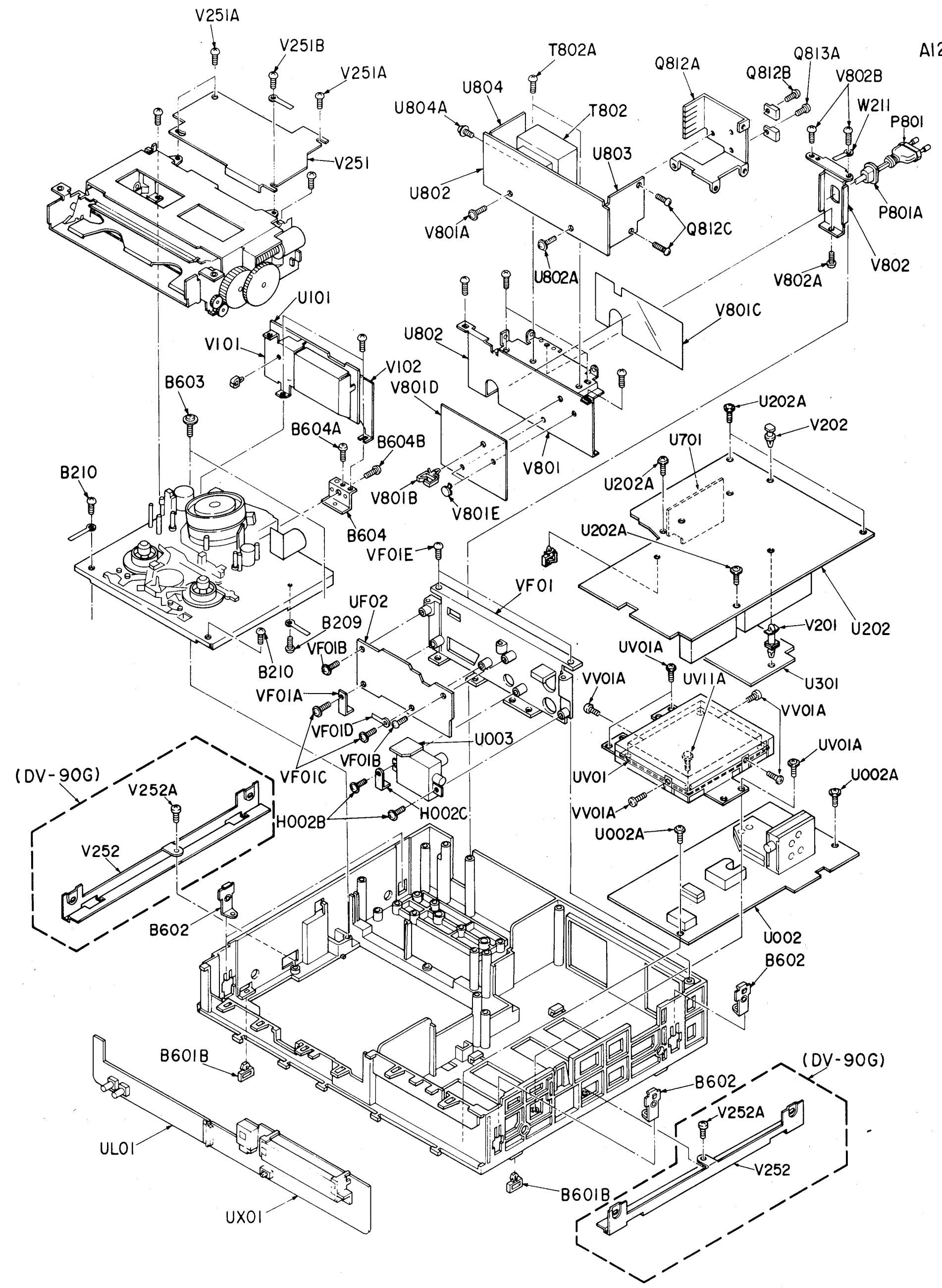
(2) Remote Control Unit


AT01
ST01
UT01
PT02
AT04
PT01
PT03
AT02
AT03

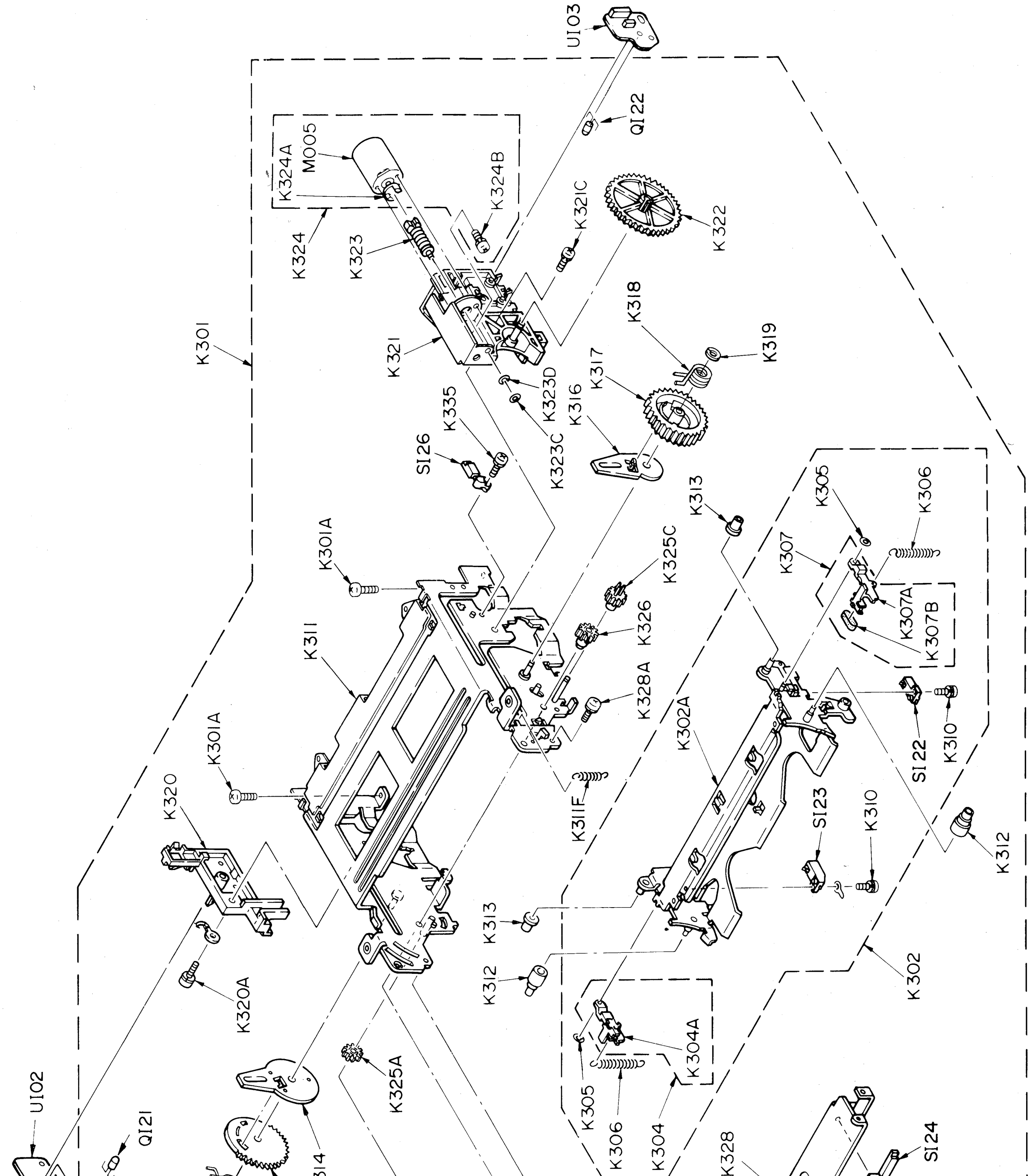
(3) Cabinet Assembly


A104C
A104
A104C
A104C
A101
A105
A104C
A105A
A106
A101A
A101D
A101B
A120
A120A
A120A
A120A

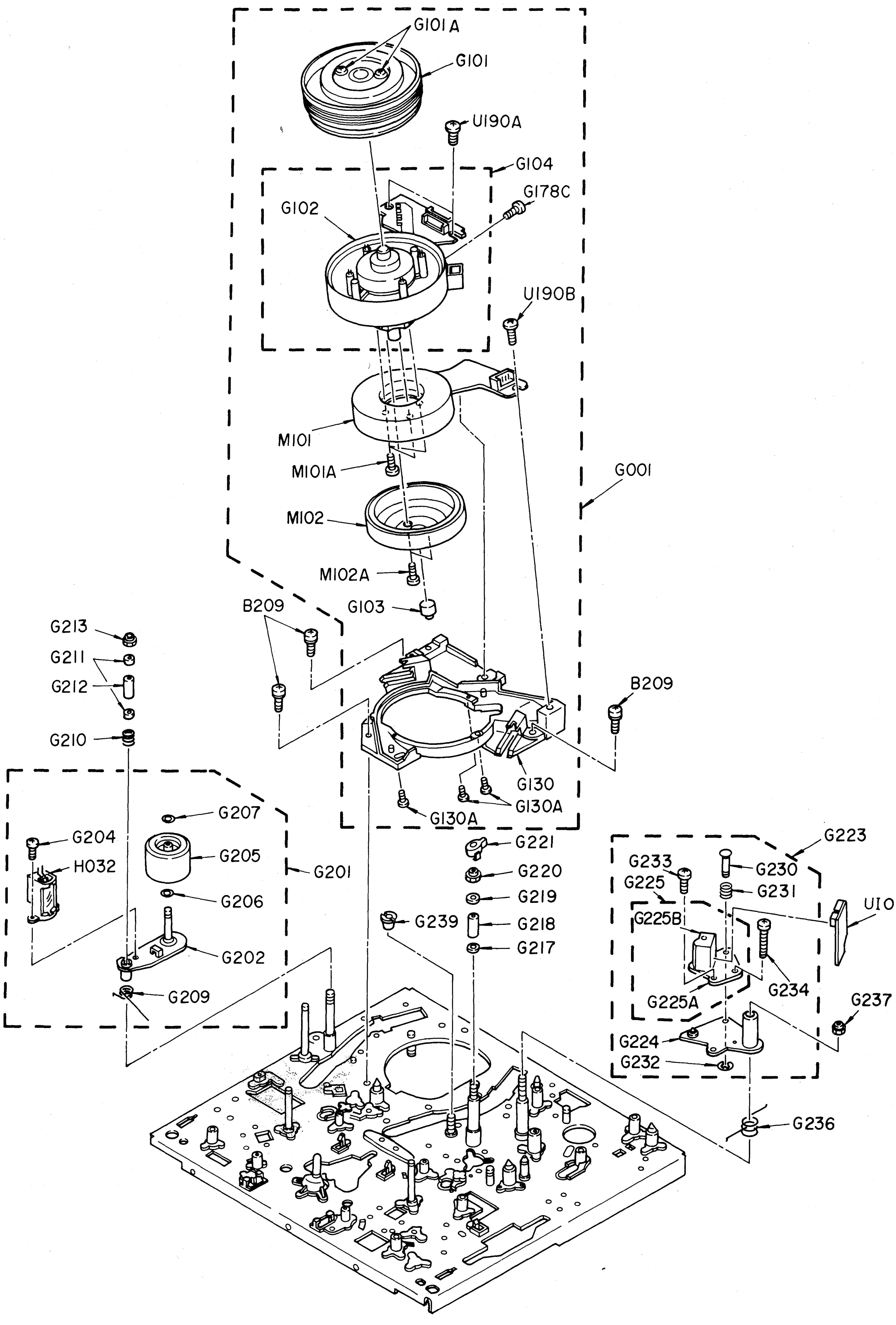
(4) Chassis Assembly


V251A
V251B
V251A
V251
U804A
U804
T802A
T802
Q812A
Q812B
Q813A
V802B
W211
P801
U802
U803
V801A
Q812C
P801A
U802A
V802A
V802
U101
V101
V102
V801C
U802
B603
V801D
U202A
V202
B604A
B604B
V801
U701
B210
V801B
V801E
U202A
B604
VF01E
U202A
VF01
UF02
B209
VF01B
B210
V201
U202
UV01A
VV01A
UV11A
U301
VF01A
VV01A
VF01D
U003
UV01A
VF01B
U002A
(DV-90G)
V252A
VF01C
UV01
H002B
H002C
VV01A
U002A
V252
B602
U002
B602
B601B
B602
(DV-90G)
V252A
UL01
V252
B601B
UX01

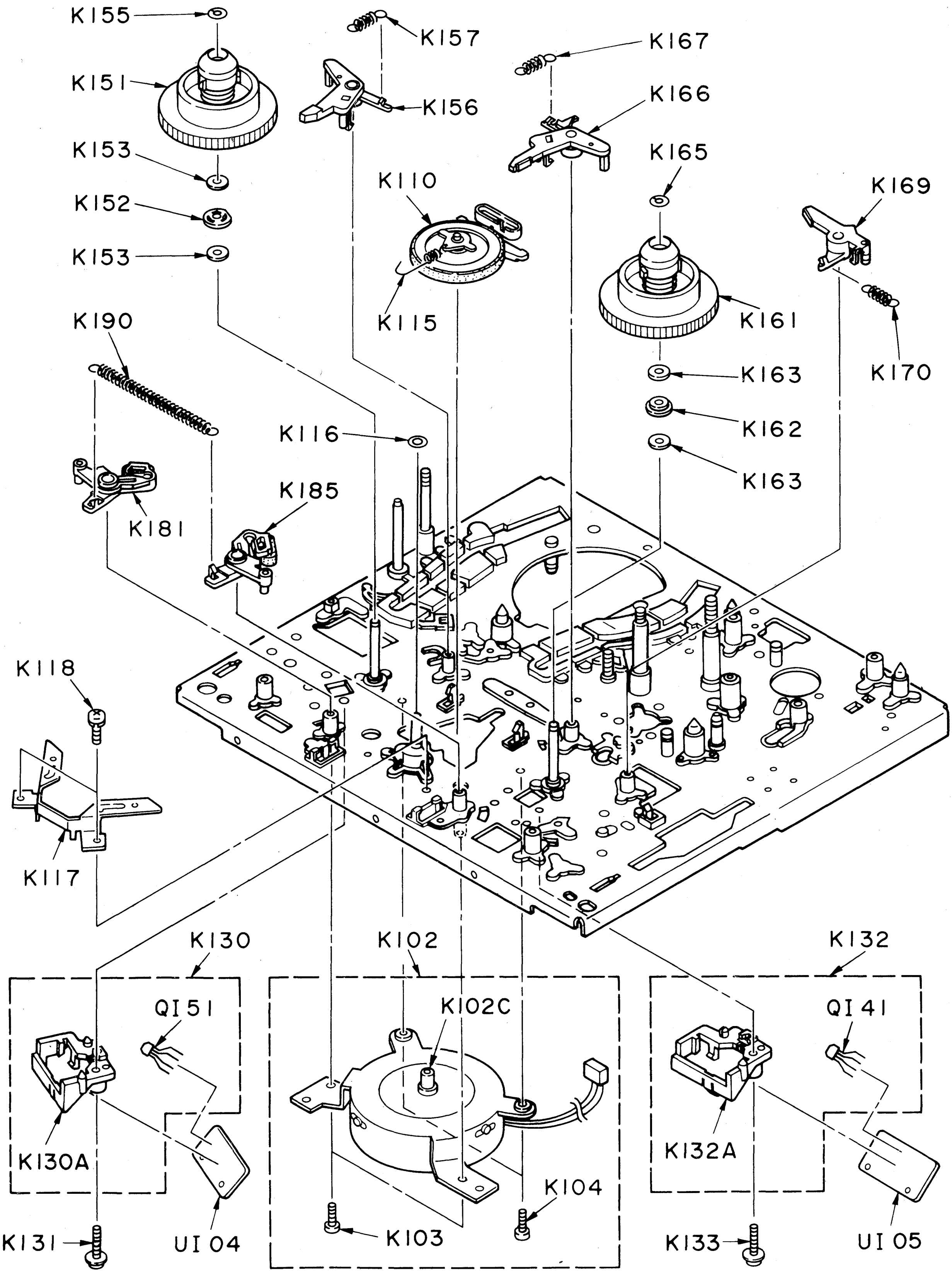
(5) Cassette Holder Assembly


U103
Q122
M005
K324A
K324B
K324
K323
K321C
K322
K321
K318
K319
K301
K317
K316
K323D
K323C
K335
S126
K313
K305
K306
K307
K307A
K307B
K301A
K325C
K326
K311
K328A
K302A
S122
K310
K301A
K311F
K320
S123
K310
K312
K313
K312
K302
K320A
K304A
K325A
U102
Q121
K314
K305
K306
K304
K328
S124
K315
K318
K319
K330
K336
K325A
S125
K328A
K339
K325
K325B

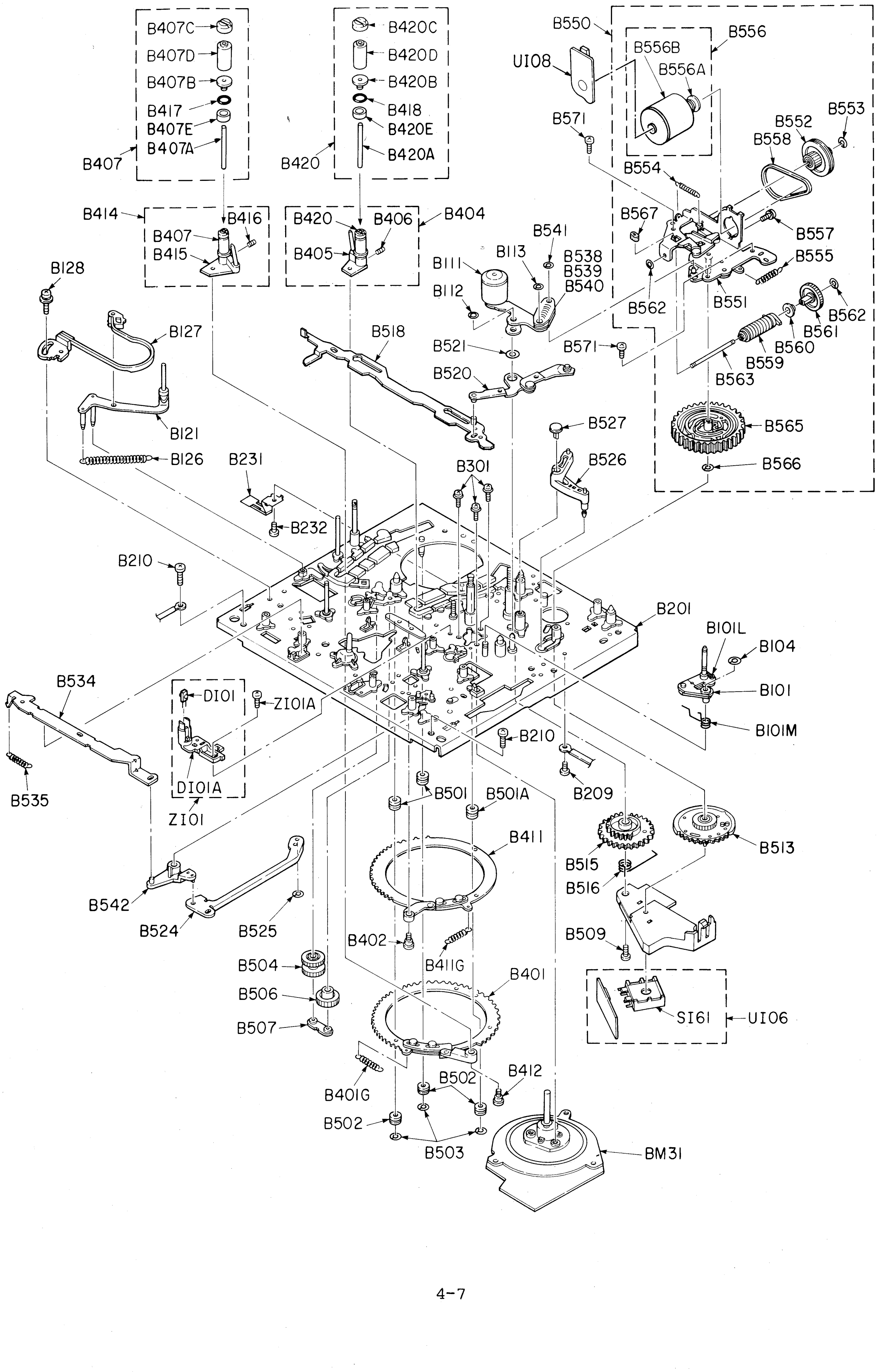
(6) Mechanical Parts (1)


G101A
G101
U190A
G104
G178C
G102
U190B
M101
M101A
G001
M102
M102A
G103
B209
G213
G211
G212
G210
B209
G130
G130A
G130A
G207
G204
H032
G205
G201
G206
G202
G209
G221
G220
G219
G239
G218
G217
G223
G233
G230
G225
G231
U107
G225B
G234
G225A
G237
G224
G232
G236

(7) Mechanical Parts (2)


K155
K157
K167
K151
K156
K166
K153
K165
K110
K169
K152
K153
K115
K161
K190
K163
K170
K116
K162
K163
K185
K181
K118
K117
K130
K102
K132
QI51
K102C
QI41
K130A
K132A
K104
K131
UI04
K103
K133
UI05

(8) Mechanical Parts (3)


B407C
B407D
B407B
B417
B407E
B407A
B407
B420C
B420D
B420B
B418
B420E
B420A
B420
B550
U108
B556
B556B
B556A
B571
B553
B552
B558
B554
B414
B416
B407
B415
B420
B406
B404
B405
B567
B557
B541
B555
B113
B538
B539
B540
B111
B128
B112
B562
B551
B562
B561
B127
B518
B521
B571
B560
B559
B563
B520
B527
B565
B121
B526
B126
B231
B566
B301
B232
B210
B201
B101L
B104
B534
D101
Z101A
B101
B101M
B210
B501
B501A
B209
D101A
B535
Z101
B411
B515
B513
B516
B542
B524
B525
B509
B402
B504
B411G
B401
B506
S161
U106
B507
B412
B502
B401G
B502
B503
BM31

2. Parts List

ELECTRICAL PARTS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
U002	70197840	P C Board Assy,PIF	TIMER 2,DV-90G	
INTEGRATED CIRCUITS				
IC002	23119143	IC	M51365SP	
ICA01	70119879	IC	TMP47C231AN4956	
ICA02	70119517	IC	M58659P	
ICA03	23119441	IC	LA7910	
ICA04	B0272490	IC	TD6305	
ICA12	B0372960	IC	TA78L009AP	
ICL63	70119577	IC	PST520D	
ICX64	70119880	IC	TMP47C410AN6696	
ICX65	70119891	IC	SAF1135P	
ICX66	70119890	IC	SAA5235	
ICX67	70119413	IC	PST520C	
TRANSISTORS				
Q001	A6708871	Transistor	2SC388ATM	
Q003	A6534430	Transistor	2SA1048-Y	
Q004	A6332430	Transistor	2SC2458-Y	
Q007	A6534430	Transistor	2SA1048-Y	
Q008	A6002010	Transistor	RN1201	
Q009	A6317440	Transistor	2SC1815-Y	
Q010	A6002020	Transistor	RN1202	
Q011	A6342200	Transistor	2SC2878A	
QA06	A6041876	Transistor,FET	2SK117-GRFA2	
QA07	A6332430	Transistor	2SC2458-Y	
QA08	A6002060	Transistor	RN1206	
QA09	A6546320	Transistor	2SA1297GR	
QL60	A6002060	Transistor	RN1206	
QL61	A6002060	Transistor	RN1206	
QL62	A6002040	Transistor	RN1204	
QX61	A6002040	Transistor	RN1204	
QX63	A6534430	Transistor	2SA1048-Y	
DIODES				
D001	A7160570	Diode	1SS176	
DA01	70115382	Diode,Zener	MA1330-M	
DA02	A7160590	Diode	1SS177	
DL61	A7160590	Diode	1SS177	
DL62	A7160590	Diode	1SS177	
DL63	A7160590	Diode	1SS177	
DL64	A7160590	Diode	1SS177	
DL65	A7110017	Diode,Zener	05Z 5. 6-Y	
COILS				
L001	23261986	Coil,Choke	TRF9220	
L002	23261985	Coil,Choke	TRF9221	
L003	23262745	Coil,IF	TRF1132	
L004	23238912	Coil,Peaking	TRF4680AC	
L005	23237988	Coil,Peaking	TRF4829AC	
L006	23238921	Coil,Peaking	TRF4120AC	
L008	23237977	Coil,Peaking	TRF4680AC	
L009	23237976	Coil,Peaking	TRF4820AC	
L051	23262783	Coil,IF	TRF1105	
L052	23262813	Coil,IF	TRF1077D	
L053	23262748	Coil,IF	TRF1135K	
L054	23262753	Coil,IF	TRF1136K	
LA01	23238912	Coil,Peaking	TRF4680AC	
LA02	23238653	Coil,Peaking	TRF4470AI	
LL60	23238653	Coil,Peaking	TRF4470AI	
LX60	23237987	Coil,Peaking	TRF4100AC	
CAPACITORS				
C001	24474103	Cap,Ceramic	0. 01MF	N 50V
C002	24474103	Cap,Ceramic	0. 01MF	N 50V
C003	24474103	Cap,Ceramic	0. 01MF	N 50V
C004	24474103	Cap,Ceramic	0. 01MF	N 50V
C005	24538124	Cap,Plastic	0. 12MF	J 50V
C006	24206229	Cap,Electrolytic	2. 2MF	M 50V
C007	24206229	Cap,Electrolytic	2. 2MF	M 50V
C008	24474103	Cap,Ceramic	0. 01MF	N 50V
C009	24203470	Cap,Electrolytic	47MF	M 16V
C010	24474103	Cap,Ceramic	0. 01MF	N 50V
C011	24203100	Cap,Electrolytic	10MF	M 16V
C012	24474103	Cap,Ceramic	0. 01MF	N 50V
C013	24203220	Cap,Electrolytic	22MF	M 16V
C014	24474103	Cap,Ceramic	0. 01MF	N 50V
C015	24203470	Cap,Electrolytic	47MF	M 16V
C016	24474103	Cap,Ceramic	0. 01MF	N 50V
C017	24203100	Cap,Electrolytic	10MF	M 16V
C018	24206478	Cap,Electrolytic	0. 47MF	M 50V
C019	24206010	Cap,Electrolytic	1MF	M 50V
C020	24591473	Cap,Plastic	0. 047MF	J 50V
C021	24206010	Cap,Electrolytic	1MF	M 50V
C022	24203470	Cap,Electrolytic	47MF	M 16V
C023	24851102	Cap,Ceramic	1000PF	K 25V
C024	24851102	Cap,Ceramic	1000PF	K 25V
C028	24474103	Cap,Ceramic	0. 01MF	N 50V
C029	24473470	Cap,Ceramic	47PF	J 50V
C030	24473470	Cap,Ceramic	47PF	J 50V
C031	24538104	Cap,Plastic	0. 1MF	J 50V
C032	24473120	Cap,Ceramic	12PF	J 50V
C033	24591392	Cap,Plastic	3900PF	J 50V
C034	24203100	Cap,Electrolytic	10MF	M 16V
C035	24203470	Cap,Electrolytic	47MF	M 16V
C036	24353100	Cap,Ceramic	10PF	J 50V
C038	24538103	Cap,Plastic	0. 01MF	J 50V
C039	24357820	Cap,Ceramic	82PF	J 50V
C040	24357040	Cap,Ceramic	4PF	J 50V
C041	24357040	Cap,Ceramic	4PF	J 50V
CA01	24206100	Cap,Electrolytic	10MF	M 50V
CA02	24203100	Cap,Electrolytic	10MF	M 16V
CA03	24474103	Cap,Ceramic	0. 01MF	N 50V
CA04	24203100	Cap,Electrolytic	10MF	M 16V
CA05	24474103	Cap,Ceramic	0. 01MF	N 50V
CA06	24232223	Cap,Ceramic	0. 022MF	Z 50V
CA07	24473300	Cap,Ceramic	30PF	J 50V
CA08	24473300	Cap,Ceramic	30PF	J 50V
CA09	24202330	Cap,Electrolytic	33MF	M 10V
CA10	24474103	Cap,Ceramic	0. 01MF	N 50V
CA11	24474102	Cap,Ceramic	1000PF	K 50V
CA12	24473240	Cap,Ceramic	24PF	J 50V
CA13	24473240	Cap,Ceramic	24PF	J 50V
CA14	24474102	Cap,Ceramic	1000PF	K 50V
CA15	24474103	Cap,Ceramic	0. 01MF	N 50V
CA16	24591103	Cap,Plastic	0. 01MF	J 50V
CA17	24591104	Cap,Plastic	0. 1MF	J 50V
CA22	24203100	Cap,Electrolytic	10MF	M 16V
CL60	24793222	Cap,Electrolytic	2200MF	M 10V
CL61	24636010	Cap,Electrolytic	1MF	M 50V
CL62	24795470	Cap,Electrolytic	47MF	M 25V
CL63	24795221	Cap,Electrolytic	220MF	M 25V
CX61	24202101	Cap,Electrolytic	100MF	M 10V
CX62	24474103	Cap,Ceramic	0. 01MF	N 50V
CX63	24473390	Cap,Ceramic	39PF	J 50V
CX64	24473390	Cap,Ceramic	39PF	J 50V
CX65	24202101	Cap,Electrolytic	100MF	M 10V
CX66	24474103	Cap,Ceramic	0. 01MF	N 50V
CX70	24538683	Cap,Plastic	0. 068MF	J 50V
CX71	24203101	Cap,Electrolytic	100MF	M 16V
CX72	24474103	Cap,Ceramic	0. 01MF	N 50V
CX73	24538474	Cap,Plastic	0. 47MF	J 50V
CX74	24474102	Cap,Ceramic	1000PF	K 50V
CX75	24472150	Cap,Ceramic	15PF	J 50V
CX76	24474102	Cap,Ceramic	1000PF	K 50V
CX77	24474471	Cap,Ceramic	470PF	K 50V
CX78	24538223	Cap,Plastic	0. 022MF	J 50V
CX79	24474271	Cap,Ceramic	270PF	K 50V
CX80	24474101	Cap,Ceramic	100PF	K 50V
CX81	24473150	Cap,Ceramic	15PF	J 50V
CX82	24474820	Cap,Ceramic	82PF	K 50V
CX83	24474103	Cap,Ceramic	0. 01MF	N 50V
RESISTORS				
R001	24366151	Res,Carbon	150	J 1/6W
R002	24366101	Res,Carbon	100	J 1/6W
R003	24366272	Res,Carbon	2. 7K	J 1/6W
R004	24366102	Res,Carbon	1K	J 1/6W
R005	24366621	Res,Carbon	620	J 1/6W
R006	24366270	Res,Carbon	27	J 1/6W
R007	24366102	Res,Carbon	1K	J 1/6W
R008	24366474	Res,Carbon	470K	J 1/6W
R010	24366164	Res,Carbon	160K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R011	24366221	Res,Carbon	220	J 1/6W
R012	24366473	Res,Carbon	47K	J 1/6W
R013	24366330	Res,Carbon	33	J 1/6W
R014	24366561	Res,Carbon	560	J 1/6W
R015	24366224	Res,Carbon	220K	J 1/6W
R016	24366244	Res,Carbon	240K	J 1/6W
R017	24366224	Res,Carbon	220K	J 1/6W
R018	24366474	Res,Carbon	470K	J 1/6W
R019	24366334	Res,Carbon	330K	J 1/6W
R020	24366105	Res,Carbon	1M	J 1/6W
R021	24366471	Res,Carbon	470	J 1/6W
R022	24366204	Res,Carbon	200K	J 1/6W
R026	24366511	Res,Carbon	510	J 1/6W
R027	24366242	Res,Carbon	2. 4K	J 1/6W
R032	24366432	Res,Carbon	4. 3K	J 1/6W
R033	24366132	Res,Carbon	1. 3K	J 1/6W
R034	24366181	Res,Carbon	180	J 1/6W
R035	24366562	Res,Carbon	5. 6K	J 1/6W
R036	24366392	Res,Carbon	3. 9K	J 1/6W
R037	24366222	Res,Carbon	2. 2K	J 1/6W
R038	24366222	Res,Carbon	2. 2K	J 1/6W
R039	24366272	Res,Carbon	2. 7K	J 1/6W
R040	24366121	Res,Carbon	120	J 1/6W
R041	24366221	Res,Carbon	220	J 1/6W
R042	24366471	Res,Carbon	470	J 1/6W
R043	24366331	Res,Carbon	330	J 1/6W
R044	24366752	Res,Carbon	7. 5K	J 1/6W
R045	24366471	Res,Carbon	470	J 1/6W
R046	24366681	Res,Carbon	680	J 1/6W
R047	24366183	Res,Carbon	18K	J 1/6W
R051	24066983	Res,Variable	5K	
R060	24366331	Res,Carbon	330	J 1/6W
R063	24366680	Res,Carbon	68	J 1/6W
RA01	24366102	Res,Carbon	1K	J 1/6W
RA02	24366102	Res,Carbon	1K	J 1/6W
RA03	24366102	Res,Carbon	1K	J 1/6W
RA04	24366102	Res,Carbon	1K	J 1/6W
RA05	24366201	Res,Carbon	200	J 1/6W
RA06	24366151	Res,Carbon	150	J 1/6W
RA07	24366562	Res,Carbon	5. 6K	J 1/6W
RA09	24366392	Res,Carbon	3. 9K	J 1/6W
RA10	24366152	Res,Carbon	1. 5K	J 1/6W
RA11	24366181	Res,Carbon	180	J 1/6W
RA12	24366393	Res,Carbon	39K	J 1/6W
RA13	24366273	Res,Carbon	27K	J 1/6W
RA14	24366334	Res,Carbon	330K	J 1/6W
RA15	24366562	Res,Carbon	5. 6K	J 1/6W
RA16	24366682	Res,Carbon	6. 8K	J 1/6W
RA17	24366682	Res,Carbon	6. 8K	J 1/6W
RA18	24366103	Res,Carbon	10K	J 1/6W
RA19	24366102	Res,Carbon	1K	J 1/6W
RA24	24366102	Res,Carbon	1K	J 1/6W
RA25	24366472	Res,Carbon	4. 7K	J 1/6W
RA28	24366103	Res,Carbon	10K	J 1/6W
RA29	24366103	Res,Carbon	10K	J 1/6W
RA30	24552102	Res,Oxide Metal	1K	J 1/2W
RA31	24366221	Res,Carbon	220	J 1/6W
RA32	24366221	Res,Carbon	220	J 1/6W
RA33	24366221	Res,Carbon	220	J 1/6W
RA34	24366103	Res,Carbon	10K	J 1/6W
RA35	24366103	Res,Carbon	10K	J 1/6W
RA36	24366103	Res,Carbon	10K	J 1/6W
RA37	24366101	Res,Carbon	100	J 1/6W
RL61	24366103	Res,Carbon	10K	J 1/6W
RL62	24366472	Res,Carbon	4. 7K	J 1/6W
RL63	24366473	Res,Carbon	47K	J 1/6W
RL64	24366152	Res,Carbon	1. 5K	J 1/6W
RL65	24366151	Res,Carbon	150	J 1/6W
RL66	24366151	Res,Carbon	150	J 1/6W
RL67	24552391	Res,Oxide Metal	390	J 1/2W
RX64	24366183	Res,Carbon	18K	J 1/6W
RX65	24366183	Res,Carbon	18K	J 1/6W
RX66	24366103	Res,Carbon	10K	J 1/6W
RX67	24366103	Res,Carbon	10K	J 1/6W
RX68	24366103	Res,Carbon	10K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RX69	24366103	Res,Carbon	10K	J 1/6W
RX70	24366103	Res,Carbon	10K	J 1/6W
RX71	24366101	Res,Carbon	100	J 1/6W
RX72	24366101	Res,Carbon	100	J 1/6W
RX73	24366101	Res,Carbon	100	J 1/6W
RX74	24366101	Res,Carbon	100	J 1/6W
RX75	24366101	Res,Carbon	100	J 1/6W
RX76	24366101	Res,Carbon	100	J 1/6W
RX77	24366101	Res,Carbon	100	J 1/6W
RX78	24366103	Res,Carbon	10K	J 1/6W
RX79	24366103	Res,Carbon	10K	J 1/6W
RX80	24366103	Res,Carbon	10K	J 1/6W
RX81	24366222	Res,Carbon	2. 2K	J 1/6W

MISCELLANEOUS

PA01	70163071	Phono Jack	
XA01	23153969	Crystal	
XA02	23153847	Resonator,4MHz,TCR1014	
XX60	23153847	Resonator,4MHz,TCR1014	
XX61	23153763	Crystal	
Z001	A5611190	Filter,38.9MHz,F1037	
Z002	23107915	Filter,TCF1017	
Z003	23107947	Filter,SIF,5. 5MHz	
Z004	23107740	Filter,TCF1049	
Z802	23107672	DC-DC Converter,Z-802	
ZA02	24000760	Resistor Block,10k x 10	
ZA03	24000766	Resistor Block,10Kx4	
ZL62	23118132	IC Protector	
U002	70197957	P C Board Assy,PIF	TIMER 2,DV-90T

INTEGRATED CIRCUITS

IC002	23119143	IC	M51365SP
ICA01	70119879	IC	TMP47C231AN4956
ICA02	70119517	IC	M58659P
ICA03	23119441	IC	LA7910
ICA04	B0272490	IC	TD6305
ICL63	70119577	IC	PST520D

TRANSISTORS

Q001	A6708871	Transistor	2SC388ATM
Q003	A6534430	Transistor	2SA1048-Y
Q004	A6332430	Transistor	2SC2458-Y
Q007	A6534430	Transistor	2SA1048-Y
Q008	A6002010	Transistor	RN1201
Q009	A6317440	Transistor	2SC1815-Y
Q010	A6002020	Transistor	RN1202
Q011	A6342200	Transistor	2SC2878A
QA06	A6041876	Transistor,FET	2SK117-GRFA2
QA07	A6332430	Transistor	2SC2458-Y
QA08	A6002060	Transistor	RN1206
QA11	A6546320	Transistor	2SA1297GR
QL60	A6002060	Transistor	RN1206
QL61	A6002060	Transistor	RN1206
QL62	A6002040	Transistor	RN1204

DIODES

D001	A7160570	Diode	1SS176
DA01	70115382	Diode,Zener	MA1330-M
DA02	A7160590	Diode	1SS177
DL61	A7160590	Diode	1SS177
DL62	A7160590	Diode	1SS177
DL63	A7160590	Diode	1SS177
DL64	A7160590	Diode	1SS177
DL65	A7110017	Diode,Zener	05Z 5. 6-Y

COILS

L001	23261986	Coil,Choke	TRF9220
L002	23261985	Coil,Choke	TRF9221
L003	23262745	Coil,IF	TRF1132
L004	23238912	Coil,Peaking	TRF4680AC
L005	23237988	Coil,Peaking	TRF4829AC
L006	23238921	Coil,Peaking	TRF4120AC
L008	23237977	Coil,Peaking	TRF4680AC
L009	23237976	Coil,Peaking	TRF4820AC
L051	23262783	Coil,IF	TRF1105
L052	23262813	Coil,IF	TRF1077D
L053	23262748	Coil,IF	TRF1135K
L054	23262753	Coil,IF	TRF1136K
LA01	23238912	Coil,Peaking	TRF4680AC

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
LA02	23238653	Coil, Peaking	TRF4470AI	
LL60	23238653	Coil, Peaking	TRF4470AI	

CAPACITORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C001	24474103	Cap, Ceramic	0. 01MF	N 50V
C002	24474103	Cap, Ceramic	0. 01MF	N 50V
C003	24474103	Cap, Ceramic	0. 01MF	N 50V
C004	24474103	Cap, Ceramic	0. 01MF	N 50V
C005	24538124	Cap, Plastic	0. 12MF	J 50V
C006	24206229	Cap, Electrolytic	2. 2MF	M 50V
C007	24206229	Cap, Electrolytic	2. 2MF	M 50V
C008	24474103	Cap, Ceramic	0. 01MF	N 50V
C009	24203470	Cap, Electrolytic	47MF	M 16V
C010	24474103	Cap, Ceramic	0. 01MF	N 50V
C011	24203100	Cap, Electrolytic	10MF	M 16V
C012	24474103	Cap, Ceramic	0. 01MF	N 50V
C013	24203220	Cap, Electrolytic	22MF	M 16V
C014	24474103	Cap, Ceramic	0. 01MF	N 50V
C015	24203470	Cap, Electrolytic	47MF	M 16V
C016	24474103	Cap, Ceramic	0. 01MF	N 50V
C017	24203100	Cap, Electrolytic	10MF	M 16V
C018	24206478	Cap, Electrolytic	0. 47MF	M 50V
C019	24206010	Cap, Electrolytic	1MF	M 50V
C020	24591473	Cap, Plastic	0. 047MF	J 50V
C021	24206010	Cap, Electrolytic	1MF	M 50V
C022	24203470	Cap, Electrolytic	47MF	M 16V
C023	24851102	Cap, Ceramic	1000PF	K 25V
C024	24851102	Cap, Ceramic	1000PF	K 25V
C028	24474103	Cap, Ceramic	0. 01MF	N 50V
C029	24473470	Cap, Ceramic	47PF	J 50V
C030	24473470	Cap, Ceramic	47PF	J 50V
C031	24538104	Cap, Plastic	0. 1MF	J 50V
C032	24473120	Cap, Ceramic	12PF	J 50V
C033	24591392	Cap, Plastic	3900PF	J 50V
C034	24203100	Cap, Electrolytic	10MF	M 16V
C035	24203470	Cap, Electrolytic	47MF	M 16V
C036	24353100	Cap, Ceramic	10PF	J 50V
C038	24538103	Cap, Plastic	0. 01MF	J 50V
C039	24357820	Cap, Ceramic	82PF	J 50V
C040	24357040	Cap, Ceramic	4PF	J 50V
C041	24357040	Cap, Ceramic	4PF	J 50V
CA01	24206100	Cap, Electrolytic	10MF	M 50V
CA02	24203100	Cap, Electrolytic	10MF	M 16V
CA03	24474103	Cap, Ceramic	0. 01MF	N 50V
CA04	24203100	Cap, Electrolytic	10MF	M 16V
CA05	24474103	Cap, Ceramic	0. 01MF	N 50V
CA06	24232223	Cap, Ceramic	0. 022MF	Z 50V
CA07	24473300	Cap, Ceramic	30PF	J 50V
CA08	24473300	Cap, Ceramic	30PF	J 50V
CA09	24202330	Cap, Electrolytic	33MF	M 10V
CA10	24474103	Cap, Ceramic	0. 01MF	N 50V
CA11	24474102	Cap, Ceramic	1000PF	K 50V
CA12	24473240	Cap, Ceramic	24PF	J 50V
CA13	24473240	Cap, Ceramic	24PF	J 50V
CA14	24474102	Cap, Ceramic	1000PF	K 50V
CA15	24474103	Cap, Ceramic	0. 01MF	N 50V
CA16	24591103	Cap, Plastic	0. 01MF	J 50V
CA17	24591104	Cap, Plastic	0. 1MF	J 50V
CA22	24203100	Cap, Electrolytic	10MF	M 16V
CL60	24793222	Cap, Electrolytic	2200MF	M 10V
CL61	24636010	Cap, Electrolytic	1MF	M 50V
CL62	24795470	Cap, Electrolytic	47MF	M 25V
CL63	24795221	Cap, Electrolytic	220MF	M 25V

RESISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R001	24366151	Res, Carbon	150	J 1/6W
R002	24366101	Res, Carbon	100	J 1/6W
R003	24366272	Res, Carbon	2. 7K	J 1/6W
R004	24366102	Res, Carbon	1K	J 1/6W
R005	24366621	Res, Carbon	620	J 1/6W
R006	24366270	Res, Carbon	27	J 1/6W
R007	24366102	Res, Carbon	1K	J 1/6W
R008	24366474	Res, Carbon	470K	J 1/6W
R010	24366164	Res, Carbon	160K	J 1/6W
R011	24366221	Res, Carbon	220	J 1/6W
R012	24366473	Res, Carbon	47K	J 1/6W
R013	24366330	Res, Carbon	33	J 1/6W
R014	24366561	Res, Carbon	560	J 1/6W
R015	24366224	Res, Carbon	220K	J 1/6W
R016	24366244	Res, Carbon	240K	J 1/6W
R017	24366224	Res, Carbon	220K	J 1/6W
R018	24366474	Res, Carbon	470K	J 1/6W
R019	24366334	Res, Carbon	330K	J 1/6W
R020	24366105	Res, Carbon	1M	J 1/6W
R021	24366471	Res, Carbon	470	J 1/6W
R022	24366204	Res, Carbon	200K	J 1/6W
R026	24366511	Res, Carbon	510	J 1/6W
R027	24366242	Res, Carbon	2. 4K	J 1/6W
R032	24366432	Res, Carbon	4. 3K	J 1/6W
R033	24366132	Res, Carbon	1. 3K	J 1/6W
R034	24366181	Res, Carbon	180	J 1/6W
R035	24366562	Res, Carbon	5. 6K	J 1/6W
R036	24366392	Res, Carbon	3. 9K	J 1/6W
R037	24366222	Res, Carbon	2. 2K	J 1/6W
R038	24366222	Res, Carbon	2. 2K	J 1/6W
R039	24366272	Res, Carbon	2. 7K	J 1/6W
R040	24366121	Res, Carbon	120	J 1/6W
R041	24366221	Res, Carbon	220	J 1/6W
R042	24366471	Res, Carbon	470	J 1/6W
R043	24366331	Res, Carbon	330	J 1/6W
R044	24366752	Res, Carbon	7. 5K	J 1/6W
R045	24366471	Res, Carbon	470	J 1/6W
R046	24366681	Res, Carbon	680	J 1/6W
R047	24366183	Res, Carbon	18K	J 1/6W
R051	24066983	Res, Variable	5K	
R060	24366331	Res, Carbon	330	J 1/6W
R063	24366680	Res, Carbon	68	J 1/6W
RA01	24366102	Res, Carbon	1K	J 1/6W
RA02	24366102	Res, Carbon	1K	J 1/6W
RA03	24366102	Res, Carbon	1K	J 1/6W
RA04	24366102	Res, Carbon	1K	J 1/6W
RA05	24366201	Res, Carbon	200	J 1/6W
RA06	24366151	Res, Carbon	150	J 1/6W
RA07	24366562	Res, Carbon	5. 6K	J 1/6W
RA09	24366392	Res, Carbon	3. 9K	J 1/6W
RA10	24366152	Res, Carbon	1. 5K	J 1/6W
RA11	24366181	Res, Carbon	180	J 1/6W
RA12	24366393	Res, Carbon	39K	J 1/6W
RA13	24366273	Res, Carbon	27K	J 1/6W
RA14	24366334	Res, Carbon	330K	J 1/6W
RA15	24366562	Res, Carbon	5. 6K	J 1/6W
RA16	24366682	Res, Carbon	6. 8K	J 1/6W
RA17	24366682	Res, Carbon	6. 8K	J 1/6W
RA21	24366103	Res, Carbon	10K	J 1/6W
RA22	24366751	Res, Carbon	750	J 1/6W
RA24	24366102	Res, Carbon	1K	J 1/6W
RA25	24366472	Res, Carbon	4. 7K	J 1/6W
RA28	24366103	Res, Carbon	10K	J 1/6W
RA29	24366103	Res, Carbon	10K	J 1/6W
RA30	24552102	Res, Oxide Metal	1K	J 1/2W
RA31	24366221	Res, Carbon	220	J 1/6W
RA32	24366221	Res, Carbon	220	J 1/6W
RA33	24366221	Res, Carbon	220	J 1/6W
RA34	24366103	Res, Carbon	10K	J 1/6W
RA35	24366103	Res, Carbon	10K	J 1/6W
RA36	24366103	Res, Carbon	10K	J 1/6W
RA37	24366101	Res, Carbon	100	J 1/6W
RL61	24366103	Res, Carbon	10K	J 1/6W
RL62	24366472	Res, Carbon	4. 7K	J 1/6W
RL63	24366473	Res, Carbon	47K	J 1/6W
RL64	24366152	Res, Carbon	1. 5K	J 1/6W
RL65	24366151	Res, Carbon	150	J 1/6W
RL66	24366151	Res, Carbon	150	J 1/6W
RL67	24552391	Res, Oxide Metal	390	J 1/2W

MISCELLANEOUS

LOCATION NUMBER	PART NUMBER	DESCRIPTION
PA01	70163071	Phono Jack
XA01	23153969	Crystal
XA02	23153847	Resonator, 4MHz, TCR1014
Z001	A5611190	Filter, 38. 9MHz, F1037
Z002	23107915	Filter, TCF1017
Z003	23107947	Filter, SIF, 5. 5MHz
Z004	23107740	Filter, TCF1049

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
Z802	23107672	DC-DC Converter, Z-802		
ZA02	24000760	Resistor Block, 10k x 10		
ZA03	24000766	Resistor Block, 10Kx4		
ZL62	23118132	IC Protector		
U002	70197952	P C Board Assy, PIF TIMER 2, DV-90W		

INTEGRATED CIRCUITS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
IC002	23119143	IC	M51365SP	
ICA01	70119879	IC	TMP47C231AN4956	
ICA02	70119517	IC	M58659P	
ICA03	23119441	IC	LA7910	
ICA04	B0272490	IC	TD6305	
ICL63	70119577	IC	PST520D	

TRANSISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
Q001	A6708871	Transistor	2SC388ATM	
Q003	A6534430	Transistor	2SA1048-Y	
Q004	A6332430	Transistor	2SC2458-Y	
Q007	A6534430	Transistor	2SA1048-Y	
Q008	A6002010	Transistor	RN1201	
Q009	A6317440	Transistor	2SC1815-Y	
Q010	A6002020	Transistor	RN1202	
Q011	A6342200	Transistor	2SC2878A	
QA06	A6041876	Transistor, FET	2SK117-GRFA2	
QA07	A6332430	Transistor	2SC2458-Y	
QA08	A6002060	Transistor	RN1206	
QA11	A6546320	Transistor	2SA1297GR	
QL60	A6002060	Transistor	RN1206	
QL61	A6002060	Transistor	RN1206	
QL62	A6002040	Transistor	RN1204	

DIODES

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
D001	A7160570	Diode	1SS176	
DA01	70115382	Diode, Zener	MA1330-M	
DA02	A7160590	Diode	1SS177	
DL61	A7160590	Diode	1SS177	
DL62	A7160590	Diode	1SS177	
DL63	A7160590	Diode	1SS177	
DL64	A7160590	Diode	1SS177	
DL65	A7110017	Diode, Zener	05Z 5. 6-Y	

COILS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
L001	23261986	Coil, Choke	TRF9220	
L002	23261986	Coil, Choke	TRF9220	
L003	23262745	Coil, IF	TRF1132	
L004	23238912	Coil, Peaking	TRF4680AC	
L005	23237988	Coil, Peaking	TRF4829AC	
L006	23238921	Coil, Peaking	TRF4120AC	
L008	23237976	Coil, Peaking	TRF4820AC	
L051	23262783	Coil, IF	TRF1105	
L052	23262813	Coil, IF	TRF1077D	
LA01	23238912	Coil, Peaking	TRF4680AC	
LA02	23238653	Coil, Peaking	TRF4470AI	
LL60	23238653	Coil, Peaking	TRF4470AI	

CAPACITORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C001	24474103	Cap, Ceramic	0. 01MF	N 50V
C002	24474103	Cap, Ceramic	0. 01MF	N 50V
C003	24474103	Cap, Ceramic	0. 01MF	N 50V
C004	24474103	Cap, Ceramic	0. 01MF	N 50V
C005	24206478	Cap, Electrolytic	0. 47MF	M 50V
C006	24206229	Cap, Electrolytic	2. 2MF	M 50V
C007	24206229	Cap, Electrolytic	2. 2MF	M 50V
C008	24474103	Cap, Ceramic	0. 01MF	N 50V
C009	24203470	Cap, Electrolytic	47MF	M 16V
C010	24474103	Cap, Ceramic	0. 01MF	N 50V
C011	24203100	Cap, Electrolytic	10MF	M 16V
C012	24474103	Cap, Ceramic	0. 01MF	N 50V
C013	24203220	Cap, Electrolytic	22MF	M 16V
C014	24474103	Cap, Ceramic	0. 01MF	N 50V
C015	24203470	Cap, Electrolytic	47MF	M 16V
C016	24474103	Cap, Ceramic	0. 01MF	N 50V
C017	24203100	Cap, Electrolytic	10MF	M 16V
C018	24206478	Cap, Electrolytic	0. 47MF	M 50V
C019	24206010	Cap, Electrolytic	1MF	M 50V
C020	24591473	Cap, Plastic	0. 047MF	J 50V
C021	24206010	Cap, Electrolytic	1MF	M 50V
C022	24203470	Cap, Electrolytic	47MF	M 16V
C023	24851102	Cap, Ceramic	1000PF	K 25V
C024	24851102	Cap, Ceramic	1000PF	K 25V
C026	24473680	Cap, Ceramic	68PF	J 50V
C028	24474103	Cap, Ceramic	0. 01MF	N 50V
C029	24473470	Cap, Ceramic	47PF	J 50V
C030	24473470	Cap, Ceramic	47PF	J 50V
C031	24538104	Cap, Plastic	0. 1MF	J 50V
C032	24473120	Cap, Ceramic	12PF	J 50V
C033	24591392	Cap, Plastic	3900PF	J 50V
C034	24203100	Cap, Electrolytic	10MF	M 16V
C035	24203470	Cap, Electrolytic	47MF	M 16V
C036	24353090	Cap, Ceramic	9PF	J 50V
CA01	24206100	Cap, Electrolytic	10MF	M 50V
CA02	24203100	Cap, Electrolytic	10MF	M 16V
CA03	24474103	Cap, Ceramic	0. 01MF	N 50V
CA04	24203100	Cap, Electrolytic	10MF	M 16V
CA05	24474103	Cap, Ceramic	0. 01MF	N 50V
CA06	24232223	Cap, Ceramic	0. 022MF	Z 50V
CA07	24473300	Cap, Ceramic	30PF	J 50V
CA08	24473300	Cap, Ceramic	30PF	J 50V
CA09	24202330	Cap, Electrolytic	33MF	M 10V
CA10	24474103	Cap, Ceramic	0. 01MF	N 50V
CA11	24474102	Cap, Ceramic	1000PF	K 50V
CA12	24473240	Cap, Ceramic	24PF	J 50V
CA13	24473240	Cap, Ceramic	24PF	J 50V
CA14	24474102	Cap, Ceramic	1000PF	K 50V
CA15	24474103	Cap, Ceramic	0. 01MF	N 50V
CA16	24591103	Cap, Plastic	0. 01MF	J 50V
CA17	24591104	Cap, Plastic	0. 1MF	J 50V
CA22	24203100	Cap, Electrolytic	10MF	M 16V
CL60	24793222	Cap, Electrolytic	2200MF	M 10V
CL61	24636010	Cap, Electrolytic	1MF	M 50V
CL62	24795470	Cap, Electrolytic	47MF	M 25V
CL63	24795221	Cap, Electrolytic	220MF	M 25V

RESISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R001	24366101	Res, Carbon	100	J 1/6W
R002	24366101	Res, Carbon	100	J 1/6W
R003	24366272	Res, Carbon	2. 7K	J 1/6W
R004	24366102	Res, Carbon	1K	J 1/6W
R005	24366471	Res, Carbon	470	J 1/6W
R006	24366270	Res, Carbon	27	J 1/6W
R007	24366102	Res, Carbon	1K	J 1/6W
R008	24366824	Res, Carbon	820K	J 1/6W
R010	24366164	Res, Carbon	160K	J 1/6W
R011	24366221	Res, Carbon	220	J 1/6W
R012	24366473	Res, Carbon	47K	J 1/6W
R013	24366330	Res, Carbon	33	J 1/6W
R014	24366561	Res, Carbon	560	J 1/6W
R015	24366224	Res, Carbon	220K	J 1/6W
R016	24366244	Res, Carbon	240K	J 1/6W
R017	24366224	Res, Carbon	220K	J 1/6W
R018	24366474	Res, Carbon	470K	J 1/6W
R019	24366334	Res, Carbon	330K	J 1/6W
R020	24366105	Res, Carbon	1M	J 1/6W
R021	24366471	Res, Carbon	470	J 1/6W
R022	24366204	Res, Carbon	200K	J 1/6W
R026	24366511	Res, Carbon	510	J 1/6W
R027	24366242	Res, Carbon	2. 4K	J 1/6W
R032	24366432	Res, Carbon	4. 3K	J 1/6W
R033	24366132	Res, Carbon	1. 3K	J 1/6W
R034	24366161	Res, Carbon	160	J 1/6W
R035	24366562	Res, Carbon	5. 6K	J 1/6W
R036	24366392	Res, Carbon	3. 9K	J 1/6W
R037	24366222	Res, Carbon	2. 2K	J 1/6W
R038	24366222	Res, Carbon	2. 2K	J 1/6W
R039	24366272	Res, Carbon	2. 7K	J 1/6W
R040	24366121	Res, Carbon	120	J 1/6W
R041	24366331	Res, Carbon	330	J 1/6W
R042	24366471	Res, Carbon	470	J 1/6W
R043	24366331	Res, Carbon	330	J 1/6W
R044	24366752	Res, Carbon	7. 5K	J 1/6W
R045	24366471	Res, Carbon	470	J 1/6W
R046	24366681	Res, Carbon	680	J 1/6W
R047	24366183	Res, Carbon	18K	J 1/6W
R051	24066983	Res, Variable	5K	
R060	24366111	Res, Carbon	110	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RA01	24366102	Res,Carbon	1K	J 1/6W
RA02	24366102	Res,Carbon	1K	J 1/6W
RA03	24366102	Res,Carbon	1K	J 1/6W
RA04	24366102	Res,Carbon	1K	J 1/6W
RA05	24366201	Res,Carbon	200	J 1/6W
RA06	24366151	Res,Carbon	150	J 1/6W
RA07	24366562	Res,Carbon	5. 6K	J 1/6W
RA09	24366392	Res,Carbon	3. 9K	J 1/6W
RA10	24366152	Res,Carbon	1. 5K	J 1/6W
RA11	24366181	Res,Carbon	180	J 1/6W
RA12	24366393	Res,Carbon	39K	J 1/6W
RA13	24366273	Res,Carbon	27K	J 1/6W
RA14	24366334	Res,Carbon	330K	J 1/6W
RA15	24366562	Res,Carbon	5. 6K	J 1/6W
RA16	24366682	Res,Carbon	6. 8K	J 1/6W
RA17	24366682	Res,Carbon	6. 8K	J 1/6W
RA21	24366103	Res,Carbon	10K	J 1/6W
RA22	24366751	Res,Carbon	750	J 1/6W
RA24	24366102	Res,Carbon	1K	J 1/6W
RA25	24366472	Res,Carbon	4. 7K	J 1/6W
RA28	24366103	Res,Carbon	10K	J 1/6W
RA29	24366103	Res,Carbon	10K	J 1/6W
RA30	24552102	Res,Oxide Metal	1K	J 1/2W
RA31	24366221	Res,Carbon	220	J 1/6W
RA32	24366221	Res,Carbon	220	J 1/6W
RA33	24366221	Res,Carbon	220	J 1/6W
RA34	24366103	Res,Carbon	10K	J 1/6W
RA35	24366103	Res,Carbon	10K	J 1/6W
RA36	24366103	Res,Carbon	10K	J 1/6W
RA37	24366101	Res,Carbon	100	J 1/6W
RL61	24366103	Res,Carbon	10K	J 1/6W
RL62	24366472	Res,Carbon	4. 7K	J 1/6W
RL63	24366473	Res,Carbon	47K	J 1/6W
RL64	24366152	Res,Carbon	1. 5K	J 1/6W
RL65	24366151	Res,Carbon	150	J 1/6W
RL66	24366151	Res,Carbon	150	J 1/6W
RL67	24552391	Res,Oxide Metal	390	J 1/2W

MISCELLANEOUS

PA01	70163071	Phono Jack
XA01	23153969	Crystal
XA02	23153847	Resonator,4MHz,TCR1014
Z001	A5611190	Filter,38.9MHz,F1037
Z002	23107915	Filter,TCF1017
Z003	23107947	Filter,SIF,5. 5MHz
Z004	23107740	Filter,TCF1049
Z802	23107672	DC-DC Converter,Z-802
ZA02	24000760	Resistor Block,10k x 10
ZA03	24000766	Resistor Block,10Kx4
ZL62	23118132	IC Protector
UX01	70197841	P C Board Assy,TIMER 1,DV-90G
UX01	70197953	P C Board Assy,TIMER 1,DV-90W
UX01	70197958	P C Board Assy,TIMER 1,DV-90T

INTEGRATED CIRCUITS

ICR01	23119566	IC	UPC1474HA
ICX01	70119878	IC	TMP47C870N4844Z
ICX03	70119413	IC	PST520C

TRANSISTORS

QX02	A6332430	Transistor	2SC2458-Y

DIODES

DR01	23115800	Diode,Photo	PH-302
DX04	A7160590	Diode	1SS177
DX05	A7160590	Diode	1SS177
DX06	A7160590	Diode	1SS177
DX07	A7160590	Diode	1SS177
DX08	A7160590	Diode	1SS177
DX09	A7160590	Diode	1SS177
DX10	A7160590	Diode	1SS177
DX11	A7160590	Diode	1SS177
DX13	A7160590	Diode	1SS177

COILS

LR01	23238722	Coil,Peaking	TRF4822AI

CAPACITORS

CR01	24202330	Cap,Electrolytic	33MF	M 10V
CR02	24203100	Cap,Electrolytic	10MF	M 16V
CR03	24203100	Cap,Electrolytic	10MF	M 16V
CR04	24593222	Cap,Plastic	2200PF	J 50V
CR05	24538473	Cap,Plastic	0. 047MF	J 50V
CR06	24501222	Cap,Plastic	2200PF	J 50V
CR07	24202101	Cap,Electrolytic	100MF	M 10V
CX01	24202101	Cap,Electrolytic	100MF	M 10V
CX02	24473330	Cap,Ceramic	33PF	J 50V
CX03	24473330	Cap,Ceramic	33PF	J 50V
CX04	24474103	Cap,Ceramic	0. 01MF	N 50V
CX05	24474103	Cap,Ceramic	0. 01MF	N 50V
CX06	24474103	Cap,Ceramic	0. 01MF	N 50V

RESISTORS

RR01	24366222	Res,Carbon	2. 2K	J 1/6W
RR02	24366100	Res,Carbon	10	J 1/6W
RR03	24366103	Res,Carbon	10K	J 1/6W
RR04	24366223	Res,Carbon	22K	J 1/6W
RX01	24366472	Res,Carbon	4. 7K	J 1/6W
RX02	24366223	Res,Carbon	22K	J 1/6W
RX03	24366222	Res,Carbon	2. 2K	J 1/6W
RX05	24366221	Res,Carbon	220	J 1/6W
RX06	24366221	Res,Carbon	220	J 1/6W
RX07	24366221	Res,Carbon	220	J 1/6W
RX08	24366221	Res,Carbon	220	J 1/6W
RX09	24366223	Res,Carbon	22K	J 1/6W
RX10	24366223	Res,Carbon	22K	J 1/6W
RX11	24366223	Res,Carbon	22K	J 1/6W
RX12	24366223	Res,Carbon	22K	J 1/6W
RX13	24366223	Res,Carbon	22K	J 1/6W
RX14	24366223	Res,Carbon	22K	J 1/6W
RX15	24366123	Res,Carbon	12K	J 1/6W
RX16	24366123	Res,Carbon	12K	J 1/6W
RX17	24366123	Res,Carbon	12K	J 1/6W
RX18	24366123	Res,Carbon	12K	J 1/6W
RX19	24366123	Res,Carbon	12K	J 1/6W
* RX20	24366102	Res,Carbon	1K	J 1/6W
* RX21	24366102	Res,Carbon	1K	J 1/6W
* RX22	24366102	Res,Carbon	1K	J 1/6W
* RX23	24366102	Res,Carbon	1K	J 1/6W
* RX24	24366102	Res,Carbon	1K	J 1/6W
RX25	24366103	Res,Carbon	10K	J 1/6W
* RX27	24366102	Res,Carbon	1K	J 1/6W
RX28	24366103	Res,Carbon	10K	J 1/6W
RX29	24366271	Res,Carbon	270	J 1/6W
* RX31	24366103	Res,Carbon	10K	J 1/6W
* RX32	24366102	Res,Carbon	1K	J 1/6W
RX33	24366102	Res,Carbon	1K	J 1/6W
RX34	24366473	Res,Carbon	47K	J 1/6W

MISCELLANEOUS

GX01	70113108	FIP,14GM6	
GX01A	70843250	FIP Holder (L)	
GX01B	70843251	FIP Holder (R)	
GX01C	70867608	Timer Filter Cover	
S201	23145532	Slide Switch,2C3P	
SL02	23145394	Push Swltch,1C1P	
SX01	23145394	Push Swltch,1C1P	
SX02	23145394	Push Swltch,1C1P	
SX03	23145394	Push Swltch,1C1P	
SX04	23145394	Push Swltch,1C1P	
SX05	23145394	Push Swltch,1C1P	
SX06	23145394	Push Swltch,1C1P	
SX07	23145394	Push Swltch,1C1P	
SX08	23145394	Push Swltch,1C1P	
SX09	23145394	Push Swltch,1C1P	
SX10	23145394	Push Swltch,1C1P	
SX11	23145394	Push Swltch,1C1P	
SX12	23145394	Push Swltch,1C1P	
SX13	23145394	Push Swltch,1C1P	
SX16	23145394	Push Swltch,1C1P	
SX17	23145394	Push Swltch,1C1P	
SX18	23145394	Push Swltch,1C1P	
SX19	23145394	Push Swltch,1C1P	
SX21	23145394	Push Swltch,1C1P	
* SX22	23145394	Push Swltch,1C1P	
TR01	23232963	Coil,Variable	TRF3055
XX01	23153847	Resonator,4MHz,TCR1014	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
U101	70197688	P C Board Assy,PREAMP		

INTEGRATED CIRCUITS

IC101	70119856	IC	AN3313	

TRANSISTORS

Q102	A6332430	Transistor	2SC2458-Y	
Q103	A6332430	Transistor	2SC2458-Y	
Q104	A6332430	Transistor	2SC2458-Y	
Q105	A6332430	Transistor	2SC2458-Y	
Q106	A6332430	Transistor	2SC2458-Y	

COILS

L101	23237837	Coil,Peaking	TRF4101AF	
L102	23238705	Coil,Peaking	TRF4560AJ	
L103	23239835	Coil,Peaking	TRF4109AJ	
L104	23237857	Coil,Peaking	TRF4150AF	

CAPACITORS

C101	24630953	Cap,Electrolytic	47MF	M 6.3V
C102	24474103	Cap,Ceramic	0. 01MF	N 50V
C103	24206010	Cap,Electrolytic	1MF	M 50V
C104	24206010	Cap,Electrolytic	1MF	M 50V
C105	24206010	Cap,Electrolytic	1MF	M 50V
C106	24206010	Cap,Electrolytic	1MF	M 50V
C107	24474103	Cap,Ceramic	0. 01MF	N 50V
C108	24474103	Cap,Ceramic	0. 01MF	N 50V
C109	24474103	Cap,Ceramic	0. 01MF	N 50V
C110	24474103	Cap,Ceramic	0. 01MF	N 50V
C111	24630953	Cap,Electrolytic	47MF	M 6.3V
C112	24474103	Cap,Ceramic	0. 01MF	N 50V
C113	24630933	Cap,Electrolytic	1MF	M 50V
C114	24473270	Cap,Ceramic	27PF	J 50V
C115	24630934	Cap,Electrolytic	0.47MF	M 50V

RESISTORS

R101	24366821	Res,Carbon	820	J 1/6W
R102	24366821	Res,Carbon	820	J 1/6W
R103	24366682	Res,Carbon	6. 8K	J 1/6W
R104	24366102	Res,Carbon	1K	J 1/6W
R105	24366682	Res,Carbon	6. 8K	J 1/6W
R106	24366102	Res,Carbon	1K	J 1/6W
R107	24366472	Res,Carbon	4. 7K	J 1/6W
R108	24366102	Res,Carbon	1K	J 1/6W
R109	24366152	Res,Carbon	1. 5K	J 1/6W
R110	24366101	Res,Carbon	100	J 1/6W
R111	24366102	Res,Carbon	1K	J 1/6W
R112	24366102	Res,Carbon	1K	J 1/6W
R113	24366681	Res,Carbon	680	J 1/6W
R114	24366102	Res,Carbon	1K	J 1/6W
R115	24366682	Res,Carbon	6. 8K	J 1/6W
R116	24366102	Res,Carbon	1K	J 1/6W

U202	70197837	P C Board Assy,MAIN		

INTEGRATED CIRCUITS

IC201	70119859	IC	BA7258AS	
IC202	B0589590	IC	TL8709P	
IC501	B0272638	IC	TD6361N-C5	
IC502	B0379180	IC	TA8618S	
IC503	B0347530	IC	TA75358CP	
IC504	B0470532	IC	TC4053BP	
IC505	B0475382	IC	TC4538BP	
IC506	B0475382	IC	TC4538BP	
IC507	B0480815	IC	TC5081AP	
IC601	70119866	IC	TMP47C460AN9238	
IC602	B0320635	IC	TA7288P	
IC603	B0320440	IC	TA7267P	
IC604	B0347230	IC	TA75339P	

TRANSISTORS

Q161	A6332430	Transistor	2SC2458-Y	
Q162	A6332430	Transistor	2SC2458-Y	
Q163	A6002020	Transistor	RN1202	
Q164	A6534430	Transistor	2SA1048-Y	
Q165	A6332430	Transistor	2SC2458-Y	
Q166	A6332430	Transistor	2SC2458-Y	
Q167	A6332430	Transistor	2SC2458-Y	
Q168	A6534430	Transistor	2SA1048-Y	
Q203	A6002040	Transistor	RN1204	
Q204	A6012010	Transistor	RN2201	

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
Q205	A6534430	Transistor	2SA1048-Y
Q206	A6002030	Transistor	RN1203
Q207	A6332430	Transistor	2SC2458-Y
Q208	A6002040	Transistor	RN1204
Q210	A6002040	Transistor	RN1204
Q211	A6012020	Transistor	RN2202
Q212	A6332430	Transistor	2SC2458-Y
Q213	A6332430	Transistor	2SC2458-Y
Q214	A6332430	Transistor	2SC2458-Y
Q215	A6012040	Transistor	RN2204
Q216	A6012040	Transistor	RN2204
Q218	A6002010	Transistor	RN1201
Q219	A6012040	Transistor	RN2204
Q220	A6002040	Transistor	RN1204
Q221	A6534430	Transistor	2SA1048-Y
Q222	A6012040	Transistor	RN2204
Q223	A6002040	Transistor	RN1204
Q224	A6534430	Transistor	2SA1048-Y
Q508	A6868350	Transistor	2SD1413
Q509	A6868350	Transistor	2SD1413
Q510	A6002060	Transistor	RN1206
Q512	A6012040	Transistor	RN2204
Q513	A6012040	Transistor	RN2204
Q514	A6002040	Transistor	RN1204
Q515	A6012040	Transistor	RN2204
Q518	A6002020	Transistor	RN1202
Q521	A6533240	Transistor	2SA966-Y
Q522	A6002040	Transistor	RN1204
Q524	A6002060	Transistor	RN1206
Q525	A6332430	Transistor	2SC2458-Y
Q526	A6332430	Transistor	2SC2458-Y
Q528	A6012040	Transistor	RN2204
Q529	A6012040	Transistor	RN2204
Q530	A6002060	Transistor	RN1206
Q531	A6534430	Transistor	2SA1048-Y
Q532	A6002020	Transistor	RN1202
Q533	A6332430	Transistor	2SC2458-Y
Q611	A6868450	Transistor	2SD1415
Q612	A6325540	Transistor	SC2236-Y
Q615	A6534430	Transistor	2SA1048-Y
Q616	A6325540	Transistor	SC2236-Y
Q617	A6325540	Transistor	SC2236-Y
Q618	A6002060	Transistor	RN1206
Q619	A6002010	Transistor	RN1201
Q620	A6325540	Transistor	SC2236-Y
Q621	A6002060	Transistor	RN1206
Q622	A6002030	Transistor	RN1203
Q623	A6002030	Transistor	RN1203
Q624	A6534430	Transistor	2SA1048-Y
Q625	23314332	Transistor	2SB1187-E
Q626	A6332430	Transistor	2SC2458-Y
Q627	A6002010	Transistor	RN1201
Q628	A6002030	Transistor	RN1203
Q629	A6002010	Transistor	RN1201
Q630	A6002020	Transistor	RN1202
Q631	A6002020	Transistor	RN1202
Q632	A6012020	Transistor	RN2202
Q633	A6012060	Transistor	RN2206
Q635	A6332430	Transistor	2SC2458-Y
Q636	A6332430	Transistor	2SC2458-Y
Q637	A6002040	Transistor	RN1204
Q640	A6332430	Transistor	2SC2458-Y

DIODES

D201	A7110160	Diode,Zener	05Z 7. 5-Y
D202	A7160570	Diode	1SS176
D204	A7152800	Diode	1SS227
D501	A7152800	Diode	1SS227
D502	A7152800	Diode	1SS227
D503	A7160570	Diode	1SS176
D504	A7160570	Diode	1SS176
D505	A7160570	Diode	1SS176
D506	A7160570	Diode	1SS176
D507	A7160570	Diode	1SS176
D521	A7152800	Diode	1SS227
D522	A7160570	Diode	1SS176

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
D523	A7160570	Diode	1SS176	
D524	A7160570	Diode	1SS176	
D525	A7160570	Diode	1SS176	
D526	A7160570	Diode	1SS176	
D530	A7160570	Diode	1SS176	
D605	A7160570	Diode	1SS176	
D606	A7160570	Diode	1SS176	
D607	A7160570	Diode	1SS176	
D609	A7160570	Diode	1SS176	
D611	A7160570	Diode	1SS176	
D612	A7110462	Diode, Zener	05Z 13-Y	

COILS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
L011	23238714	Coil, Peaking	TRF4100AJ	
L161	23237980	Coil, Peaking	TRF4390AC	
L162	23237969	Coil, Peaking	TRF4331AC	
L163	23237980	Coil, Peaking	TRF4390AC	
L164	23237985	Coil, Peaking	TRF4150AC	
L165	23238926	Coil, Peaking	TRF4479AC	
L166	23237970	Coil, Peaking	TRF4271AC	
L167	23238705	Coil, Peaking	TRF4560AJ	
L168	23237971	Coil, Peaking	TRF4221AC	
L201	23237978	Coil, Peaking	TRF4560AC	
L202	23237981	Coil, Peaking	TRF4330AC	
L205	23237978	Coil, Peaking	TRF4560AC	
L206	23237977	Coil, Peaking	TRF4680AC	
L207	23238708	Coil, Peaking	TRF4330AJ	
L208	70131039	Filter, ZBF503D-00		
L601	23238926	Coil, Peaking	TRF4479AC	

CAPACITORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C161	24632470	Cap, Electrolytic	47MF	M 10V
C162	24474103	Cap, Ceramic	0. 01MF	N 50V
C163	24473569	Cap, Ceramic	5.6PF	K 50V
C164	24473150	Cap, Ceramic	15PF	J 50V
C165	24436621	Cap, Ceramic	620PF	J 50V
C166	24473560	Cap, Ceramic	56PF	J 50V
C167	24206010	Cap, Electrolytic	1MF	M 50V
C168	24474103	Cap, Ceramic	0. 01MF	N 50V
C169	24474103	Cap, Ceramic	0. 01MF	N 50V
C170	24474103	Cap, Ceramic	0. 01MF	N 50V
C171	24474103	Cap, Ceramic	0. 01MF	N 50V
C172	24473689	Cap, Ceramic	6.8PF	K 50V
C173	24474103	Cap, Ceramic	0. 01MF	N 50V
C174	24436121	Cap, Ceramic	120PF	J 50V
C175	24474121	Cap, Ceramic	120PF	K 50V
C176	24474103	Cap, Ceramic	0. 01MF	N 50V
C177	24632470	Cap, Electrolytic	47MF	M 10V
C179	24436221	Cap, Ceramic	220PF	J 50V
C180	24473100	Cap, Ceramic	10PF	J 50V
C181	24436471	Cap, Ceramic	470PF	J 50V
C201	24203470	Cap, Electrolytic	47MF	M 16V
C202	24474103	Cap, Ceramic	0. 01MF	N 50V
C203	24474103	Cap, Ceramic	0. 01MF	N 50V
C204	24203470	Cap, Electrolytic	47MF	M 16V
C205	24206010	Cap, Electrolytic	1MF	M 50V
C206	24205479	Cap, Electrolytic	4. 7MF	M 35V
C207	24473330	Cap, Ceramic	33PF	J 50V
C208	24473399	Cap, Ceramic	3.9PF	K 50V
C209	24473560	Cap, Ceramic	56PF	J 50V
C210	24474103	Cap, Ceramic	0. 01MF	N 50V
C211	24474103	Cap, Ceramic	0. 01MF	N 50V
C212	24085973	Cap, Electrolytic	0.47MF	M 50V
C213	24591332	Cap, Plastic	3300PF	J 50V
C214	24851153	Cap, Ceramic	0.015MF	K 25V
C215	24474103	Cap, Ceramic	0. 01MF	N 50V
C216	24474103	Cap, Ceramic	0. 01MF	N 50V
C217	24473560	Cap, Ceramic	56PF	J 50V
C218	24473399	Cap, Ceramic	3. 9PF	K 50V
C219	24473270	Cap, Ceramic	27PF	J 50V
C220	24633100	Cap, Electrolytic	10MF	M 16V
C221	24473620	Cap, Ceramic	62PF	J 50V
C222	24436391	Cap, Ceramic	390PF	J 50V
C223	24473470	Cap, Ceramic	47PF	J 50V
C224	24436101	Cap, Ceramic	100PF	J 50V
C225	24201220	Cap, Electrolytic	22MF	M 6.3V
C226	24474103	Cap, Ceramic	0. 01MF	N 50V
C227	24201220	Cap, Electrolytic	22MF	M 6.3V
C228	24474103	Cap, Ceramic	0. 01MF	N 50V
C229	24793221	Cap, Electrolytic	220MF	M 10V
C230	24205479	Cap, Electrolytic	4. 7MF	M 35V
C231	24205479	Cap, Electrolytic	4. 7MF	M 35V
C232	24203100	Cap, Electrolytic	10MF	M 16V
C233	24206339	Cap, Electrolytic	3. 3MF	M 50V
C234	24473470	Cap, Ceramic	47PF	J 50V
C235	24632470	Cap, Electrolytic	47MF	M 10V
C236	24206010	Cap, Electrolytic	1MF	M 50V
C237	24436471	Cap, Ceramic	470PF	J 50V
C238	24473330	Cap, Ceramic	33PF	J 50V
C239	24473680	Cap, Ceramic	68PF	J 50V
C240	24474103	Cap, Ceramic	0. 01MF	N 50V
C241	24474103	Cap, Ceramic	0. 01MF	N 50V
C242	24591472	Cap, Plastic	4700PF	J 50V
C243	24474102	Cap, Ceramic	1000PF	K 50V
C244	24591392	Cap, Plastic	3900PF	J 50V
C245	24851683	Cap, Ceramic	0.068MF	K 25V
C246	24474103	Cap, Ceramic	0. 01MF	N 50V
C249	24474103	Cap, Ceramic	0. 01MF	N 50V
C261	24474103	Cap, Ceramic	0. 01MF	N 50V
C501	24794470	Cap, Electrolytic	47MF	M 16V
C502	24591122	Cap, Plastic	1200PF	J 50V
C503	24591183	Cap, Plastic	0. 018MF	J 50V
C504	24591183	Cap, Plastic	0. 018MF	J 50V
C505	24538683	Cap, Plastic	0. 068MF	J 50V
C506	24474102	Cap, Ceramic	1000PF	K 50V
C507	24203470	Cap, Electrolytic	47MF	M 16V
C508	24203100	Cap, Electrolytic	10MF	M 16V
C509	24203100	Cap, Electrolytic	10MF	M 16V
C510	24474102	Cap, Ceramic	1000PF	K 50V
C511	24474681	Cap, Ceramic	680PF	K 50V
C512	24206229	Cap, Electrolytic	2. 2MF	M 50V
C513	24474561	Cap, Ceramic	560PF	K 50V
C514	24202101	Cap, Electrolytic	100MF	M 10V
C515	24474101	Cap, Ceramic	100PF	K 50V
C516	24203470	Cap, Electrolytic	47MF	M 16V
C517	24203100	Cap, Electrolytic	10MF	M 16V
C518	24538823	Cap, Plastic	0. 082MF	J 50V
C519	24474103	Cap, Ceramic	0. 01MF	N 50V
C520	24203220	Cap, Electrolytic	22MF	M 16V
C521	24474222	Cap, Ceramic	2200PF	N 16V
C522	24474103	Cap, Ceramic	0. 01MF	N 50V
C523	24794470	Cap, Electrolytic	47MF	M 16V
C524	24232103	Cap, Ceramic	0. 01MF	Z 50V
C525	24538224	Cap, Plastic	0. 22MF	J 50V
C526	24206229	Cap, Electrolytic	2. 2MF	M 50V
C527	24538224	Cap, Plastic	0. 22MF	J 50V
C528	24474681	Cap, Ceramic	680PF	K 50V
C529	24591103	Cap, Plastic	0. 01MF	J 50V
C530	24203100	Cap, Electrolytic	10MF	M 16V
C531	24474102	Cap, Ceramic	1000PF	K 50V
C532	24538224	Cap, Plastic	0. 22MF	J 50V
C533	24538224	Cap, Plastic	0. 22MF	J 50V
C534	24538124	Cap, Plastic	0. 12MF	J 50V
C535	24474103	Cap, Ceramic	0. 01MF	N 50V
C536	24206010	Cap, Electrolytic	1MF	M 50V
C537	24474102	Cap, Ceramic	1000PF	K 50V
C538	24474103	Cap, Ceramic	0. 01MF	N 50V
C539	24474102	Cap, Ceramic	1000PF	K 50V
C541	24474103	Cap, Ceramic	0. 01MF	N 50V
C542	24474103	Cap, Ceramic	0. 01MF	N 50V
C547	24538333	Cap, Plastic	0. 033MF	J 50V
C550	24474102	Cap, Ceramic	1000PF	K 50V
C601	24794470	Cap, Electrolytic	47MF	M 16V
C602	24474103	Cap, Ceramic	0. 01MF	N 50V
C604	24473330	Cap, Ceramic	33PF	J 50V
C605	24473330	Cap, Ceramic	33PF	J 50V
C609	24795470	Cap, Electrolytic	47MF	M 25V
C610	24795470	Cap, Electrolytic	47MF	M 25V
C611	24205100	Cap, Electrolytic	10MF	M 35V
C612	24474103	Cap, Ceramic	0. 01MF	N 50V
C613	24474103	Cap, Ceramic	0. 01MF	N 50V
C614	24474103	Cap, Ceramic	0. 01MF	N 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C615	24232223	Cap,Ceramic	0. 022MF	Z 50V
C616	24232223	Cap,Ceramic	0. 022MF	Z 50V
C620	24232223	Cap,Ceramic	0. 022MF	Z 50V
C621	24232223	Cap,Ceramic	0. 022MF	Z 50V
C622	24232223	Cap,Ceramic	0. 022MF	Z 50V
C626	24794470	Cap,Electrolytic	47MF	M 16V
C627	24794470	Cap,Electrolytic	47MF	M 16V
C629	24795470	Cap,Electrolytic	47MF	M 25V
C631	24203220	Cap,Electrolytic	22MF	M 16V
C632	24203220	Cap,Electrolytic	22MF	M 16V
C633	24203220	Cap,Electrolytic	22MF	M 16V
C634	24203220	Cap,Electrolytic	22MF	M 16V
C636	24203100	Cap,Electrolytic	10MF	M 16V
C637	24474151	Cap,Ceramic	150PF	K 50V
C722	24632220	Cap,Electrolytic	22MF	M 10V
RESISTORS				
R161	24366102	Res,Carbon	1K	J 1/6W
R162	24367472	Res,Carbon	4. 7K	G 1/6W
R163	24367122	Res,Carbon	1. 2K	G 1/6W
R164	24367122	Res,Carbon	1. 2K	G 1/6W
R165	24366151	Res,Carbon	150	J 1/6W
R166	24366271	Res,Carbon	270	J 1/6W
R167	24366391	Res,Carbon	390	J 1/6W
R168	24366152	Res,Carbon	1. 5K	J 1/6W
R169	24367220	Res,Carbon	22	G 1/6W
R170	24367220	Res,Carbon	22	G 1/6W
R171	24366102	Res,Carbon	1K	J 1/6W
R172	24366332	Res,Carbon	3. 3K	J 1/6W
R173	24366332	Res,Carbon	3. 3K	J 1/6W
R174	24366102	Res,Carbon	1K	J 1/6W
R175	24366479	Res,Carbon	4.7	J 1/6W
R176	24366511	Res,Carbon	510	J 1/6W
R177	24366820	Res,Carbon	82	J 1/6W
R178	24366202	Res,Carbon	2K	J 1/6W
R179	24366751	Res,Carbon	750	J 1/6W
R180	24367333	Res,Carbon	33K	G 1/6W
R181	24366472	Res,Carbon	4. 7K	J 1/6W
R182	24367153	Res,Carbon	15K	G 1/6W
R183	24366272	Res,Carbon	2. 7K	J 1/6W
R184	24366102	Res,Carbon	1K	J 1/6W
R185	24366102	Res,Carbon	1K	J 1/6W
R186	24366182	Res,Carbon	1. 8K	J 1/6W
R187	24366102	Res,Carbon	1K	J 1/6W
R188	24366221	Res,Carbon	220	J 1/6W
R201	24366620	Res,Carbon	62	J 1/6W
R202	24366821	Res,Carbon	820	J 1/6W
R203	24000952	Res,Thermistor	3K	
R204	24366102	Res,Carbon	1K	J 1/6W
R205	24366151	Res,Carbon	150	J 1/6W
R206	24366272	Res,Carbon	2. 7K	J 1/6W
R207	24366684	Res,Carbon	680K	J 1/6W
R208	24366223	Res,Carbon	22K	J 1/6W
R209	24366102	Res,Carbon	1K	J 1/6W
R210	24366153	Res,Carbon	15K	J 1/6W
R211	24366363	Res,Carbon	36K	J 1/6W
R212	24366102	Res,Carbon	1K	J 1/6W
R213	24366272	Res,Carbon	2. 7K	J 1/6W
R214	24366821	Res,Carbon	820	J 1/6W
R215	24366392	Res,Carbon	3. 9K	J 1/6W
R216	24366471	Res,Carbon	470	J 1/6W
R217	24366273	Res,Carbon	27K	J 1/6W
R219	24366393	Res,Carbon	39K	J 1/6W
R220	24366183	Res,Carbon	18K	J 1/6W
R221	24366153	Res,Carbon	15K	J 1/6W
R222	24366222	Res,Carbon	2. 2K	J 1/6W
R223	24366182	Res,Carbon	1. 8K	J 1/6W
R224	24366102	Res,Carbon	1K	J 1/6W
R225	24366470	Res,Carbon	47	J 1/6W
R226	24366470	Res,Carbon	47	J 1/6W
R227	24366221	Res,Carbon	220	J 1/6W
R229	24366563	Res,Carbon	56K	J 1/6W
R230	24366183	Res,Carbon	18K	J 1/6W
R231	24366102	Res,Carbon	1K	J 1/6W
R232	24366392	Res,Carbon	3. 9K	J 1/6W
R233	24366153	Res,Carbon	15K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R234	24366392	Res,Carbon	3. 9K	J 1/6W
R235	24366822	Res,Carbon	8. 2K	J 1/6W
R237	24366474	Res,Carbon	470K	J 1/6W
R238	24366104	Res,Carbon	100K	J 1/6W
R241	24366272	Res,Carbon	2. 7K	J 1/6W
R242	24366563	Res,Carbon	56K	J 1/6W
R243	24366472	Res,Carbon	4. 7K	J 1/6W
R244	24366823	Res,Carbon	82K	J 1/6W
R245	24366472	Res,Carbon	4. 7K	J 1/6W
R246	24366393	Res,Carbon	39K	J 1/6W
R247	24366333	Res,Carbon	33K	J 1/6W
R248	24366103	Res,Carbon	10K	J 1/6W
R249	24366103	Res,Carbon	10K	J 1/6W
R251	24066952	Res,Variable	10K	
R252	24066952	Res,Variable	10K	
R253	24066952	Res,Variable	10K	
R254	24066949	Res,Variable	100K	
R255	24066954	Res,Variable	2K	
R256	24066951	Res,Variable	20K	
R257	24066955	Res,Variable	1K	
R258	24066954	Res,Variable	2K	
R259	24066953	Res,Variable	100K	
R261	24366563	Res,Carbon	56K	J 1/6W
R262	24366103	Res,Carbon	10K	J 1/6W
R263	24366472	Res,Carbon	4. 7K	J 1/6W
R264	24366392	Res,Carbon	3. 9K	J 1/6W
R265	24366392	Res,Carbon	3. 9K	J 1/6W
R267	24366473	Res,Carbon	47K	J 1/6W
R269	24366683	Res,Carbon	68K	J 1/6W
R270	24366473	Res,Carbon	47K	J 1/6W
R271	24366564	Res,Carbon	560K	J 1/6W
R272	24366102	Res,Carbon	1K	J 1/6W
R273	24366101	Res,Carbon	100	J 1/6W
R274	24366222	Res,Carbon	2. 2K	J 1/6W
R501	24552820	Res,Oxide Metal	82	J 1/2W
R502	24366912	Res,Carbon	9. 1K	J 1/6W
R503	24366103	Res,Carbon	10K	J 1/6W
R504	24366332	Res,Carbon	3. 3K	J 1/6W
R505	24366472	Res,Carbon	4. 7K	J 1/6W
R506	24366512	Res,Carbon	5. 1K	J 1/6W
R507	24366472	Res,Carbon	4. 7K	J 1/6W
R508	24366472	Res,Carbon	4. 7K	J 1/6W
R509	24366472	Res,Carbon	4. 7K	J 1/6W
R510	24366472	Res,Carbon	4. 7K	J 1/6W
R511	24366272	Res,Carbon	2. 7K	J 1/6W
R512	24941275	Res,Composition	2. 7M	J 1/4W
R513	24366752	Res,Carbon	7. 5K	J 1/6W
R514	24366683	Res,Carbon	68K	J 1/6W
R515	24366823	Res,Carbon	82K	J 1/6W
R516	24366683	Res,Carbon	68K	J 1/6W
R517	24366334	Res,Carbon	330K	J 1/6W
R518	24366334	Res,Carbon	330K	J 1/6W
R519	24366334	Res,Carbon	330K	J 1/6W
R520	24366334	Res,Carbon	330K	J 1/6W
R521	24366823	Res,Carbon	82K	J 1/6W
R522	24366184	Res,Carbon	180K	J 1/6W
R523	24366104	Res,Carbon	100K	J 1/6W
R524	24366102	Res,Carbon	1K	J 1/6W
R525	24366105	Res,Carbon	1M	J 1/6W
R526	24366303	Res,Carbon	30K	J 1/6W
R527	24366332	Res,Carbon	3. 3K	J 1/6W
R528	24366823	Res,Carbon	82K	J 1/6W
R529	24366513	Res,Carbon	51K	J 1/6W
R530	24366224	Res,Carbon	220K	J 1/6W
R531	24366223	Res,Carbon	22K	J 1/6W
R532	24366223	Res,Carbon	22K	J 1/6W
R533	24366472	Res,Carbon	4. 7K	J 1/6W
R534	24366222	Res,Carbon	2. 2K	J 1/6W
R535	24366471	Res,Carbon	470	J 1/6W
R536	24366222	Res,Carbon	2. 2K	J 1/6W
R537	24366223	Res,Carbon	22K	J 1/6W
R538	24366913	Res,Carbon	91K	J 1/6W
R539	24366472	Res,Carbon	4. 7K	J 1/6W
R540	24366221	Res,Carbon	220	J 1/6W
R542	24366122	Res,Carbon	1. 2K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R543	24366114	Res, Carbon	110K	J 1/6W
R544	24366102	Res, Carbon	1K	J 1/6W
R545	24366105	Res, Carbon	1M	J 1/6W
R546	24366471	Res, Carbon	470	J 1/6W
R547	24366181	Res, Carbon	180	J 1/6W
R548	24366105	Res, Carbon	1M	J 1/6W
R549	24366472	Res, Carbon	4. 7K	J 1/6W
R551	24066829	Res, Variable	200K	
R552	24066829	Res, Variable	200K	
R553	24066948	Res, Variable	200K	
R555	24066948	Res, Variable	200K	
R558	24066911	Res, Variable	50K	
R560	24366390	Res, Carbon	39	J 1/6W
R561	24366472	Res, Carbon	4. 7K	J 1/6W
R562	24366103	Res, Carbon	10K	J 1/6W
R563	24366334	Res, Carbon	330K	J 1/6W
R564	24366824	Res, Carbon	820K	J 1/6W
R565	24366473	Res, Carbon	47K	J 1/6W
R566	24366563	Res, Carbon	56K	J 1/6W
R567	24366104	Res, Carbon	100K	J 1/6W
R568	24366104	Res, Carbon	100K	J 1/6W
R569	24366102	Res, Carbon	1K	J 1/6W
R572	24366221	Res, Carbon	220	J 1/6W
R573	24366103	Res, Carbon	10K	J 1/6W
R574	24366472	Res, Carbon	4. 7K	J 1/6W
R575	24366824	Res, Carbon	820K	J 1/6W
R582	24366472	Res, Carbon	4. 7K	J 1/6W
R583	24366472	Res, Carbon	4. 7K	J 1/6W
R584	24366472	Res, Carbon	4. 7K	J 1/6W
R589	24366472	Res, Carbon	4. 7K	J 1/6W
R590	24366102	Res, Carbon	1K	J 1/6W
R591	24366103	Res, Carbon	10K	J 1/6W
R592	24366472	Res, Carbon	4. 7K	J 1/6W
R593	24366105	Res, Carbon	1M	J 1/6W
R594	24366244	Res, Carbon	240K	J 1/6W
R595	24366221	Res, Carbon	220	J 1/6W
R596	24366221	Res, Carbon	220	J 1/6W
R598	24366472	Res, Carbon	4. 7K	J 1/6W
R601	24366101	Res, Carbon	100	J 1/6W
R602	24366102	Res, Carbon	1K	J 1/6W
R603	24366272	Res, Carbon	2. 7K	J 1/6W
R604	24366682	Res, Carbon	6. 8K	J 1/6W
R605	24366154	Res, Carbon	150K	J 1/6W
R606	24367682	Res, Carbon	6. 8K	G 1/6W
R607	24367472	Res, Carbon	4. 7K	G 1/6W
R608	24366681	Res, Carbon	680	J 1/6W
R609	24366681	Res, Carbon	680	J 1/6W
R610	24366472	Res, Carbon	4. 7K	J 1/6W
R611	24366103	Res, Carbon	10K	J 1/6W
R613	24366103	Res, Carbon	10K	J 1/6W
R614	24366103	Res, Carbon	10K	J 1/6W
R615	24366103	Res, Carbon	10K	J 1/6W
R616	24366103	Res, Carbon	10K	J 1/6W
R617	24366103	Res, Carbon	10K	J 1/6W
R618	24366103	Res, Carbon	10K	J 1/6W
R619	24366102	Res, Carbon	1K	J 1/6W
R620	24366103	Res, Carbon	10K	J 1/6W
R621	24366103	Res, Carbon	10K	J 1/6W
R622	24366103	Res, Carbon	10K	J 1/6W
R623	24366103	Res, Carbon	10K	J 1/6W
R624	24366472	Res, Carbon	4. 7K	J 1/6W
R625	24366472	Res, Carbon	4. 7K	J 1/6W
R626	24366472	Res, Carbon	4. 7K	J 1/6W
R627	24366124	Res, Carbon	120K	J 1/6W
R628	24366124	Res, Carbon	120K	J 1/6W
R629	24366473	Res, Carbon	47K	J 1/6W
R630	24366151	Res, Carbon	150	J 1/6W
R631	24366183	Res, Carbon	18K	J 1/6W
R632	24366183	Res, Carbon	18K	J 1/6W
R633	24366102	Res, Carbon	1K	J 1/6W
R634	24366332	Res, Carbon	3. 3K	J 1/6W
R635	24366511	Res, Carbon	510	J 1/6W
R636	24366102	Res, Carbon	1K	J 1/6W
R637	24366222	Res, Carbon	2. 2K	J 1/6W
R638	24366561	Res, Carbon	560	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R639	24366102	Res, Carbon	1K	J 1/6W
R640	24366332	Res, Carbon	3. 3K	J 1/6W
R641	24366332	Res, Carbon	3. 3K	J 1/6W
R642	24366561	Res, Carbon	560	J 1/6W
R643	24982399	Res, Metal	3. 9	J 1/2W
R644	24366152	Res, Carbon	1. 5K	J 1/6W
R645	24367272	Res, Carbon	2.7K	G 1/6W
R646	24367302	Res, Carbon	3K	G 1/6W
R647	24367331	Res, Carbon	330	G 1/6W
R648	24367162	Res, Carbon	1. 6K	G 1/6W
R651	24066952	Res, Variable	10K	
R652	24066954	Res, Variable	2K	
R660	24366102	Res, Carbon	1K	J 1/6W
R661	24366102	Res, Carbon	1K	J 1/6W
R662	24366102	Res, Carbon	1K	J 1/6W
R663	24366103	Res, Carbon	10K	J 1/6W
R664	24366103	Res, Carbon	10K	J 1/6W
R665	24366334	Res, Carbon	330K	J 1/6W
R666	24366334	Res, Carbon	330K	J 1/6W
R667	24366332	Res, Carbon	3. 3K	J 1/6W
R668	24366432	Res, Carbon	4. 3K	J 1/6W
R669	24366472	Res, Carbon	4. 7K	J 1/6W
R670	24366561	Res, Carbon	560	J 1/6W
R671	24366561	Res, Carbon	560	J 1/6W
R672	24366221	Res, Carbon	220	J 1/6W
R673	24366472	Res, Carbon	4. 7K	J 1/6W
R674	24366103	Res, Carbon	10K	J 1/6W
R676	24366102	Res, Carbon	1K	J 1/6W
R677	24366103	Res, Carbon	10K	J 1/6W
R678	24366473	Res, Carbon	47K	J 1/6W
R680	24366472	Res, Carbon	4. 7K	J 1/6W
R681	24366152	Res, Carbon	1. 5K	J 1/6W
R682	24366681	Res, Carbon	680	J 1/6W
R683	24366151	Res, Carbon	150	J 1/6W
R684	24366682	Res, Carbon	6. 8K	J 1/6W
R685	24366103	Res, Carbon	10K	J 1/6W
R686	24366332	Res, Carbon	3. 3K	J 1/6W
R687	24366221	Res, Carbon	220	J 1/6W
R688	24366221	Res, Carbon	220	J 1/6W
R689	24366221	Res, Carbon	220	J 1/6W
R690	24366103	Res, Carbon	10K	J 1/6W
R692	24366223	Res, Carbon	22K	J 1/6W
R693	24366223	Res, Carbon	22K	J 1/6W
R694	24366472	Res, Carbon	4. 7K	J 1/6W
R695	24366472	Res, Carbon	4. 7K	J 1/6W
R696	24366472	Res, Carbon	4. 7K	J 1/6W
R697	24366103	Res, Carbon	10K	J 1/6W
R698	24366103	Res, Carbon	10K	J 1/6W
R699	24366103	Res, Carbon	10K	J 1/6W
R721	24366682	Res, Carbon	6. 8K	J 1/6W
⚠R723	24545479	Res, Fusible	4. 7	J 1/4W
RL21	24366102	Res, Carbon	1K	J 1/6W
RL22	24366102	Res, Carbon	1K	J 1/6W
RL23	24366102	Res, Carbon	1K	J 1/6W
RL24	24366102	Res, Carbon	1K	J 1/6W
RL25	24366102	Res, Carbon	1K	J 1/6W
RL26	24366102	Res, Carbon	1K	J 1/6W

MISCELLANEOUS

P506	23164560	Plug, 6P	
Q508B	72471081	Screw, 3x8mm	
Q508C	23721308	Screw, 3x8mm	
Q611B	23721308	Screw, 3x8mm	
Q611C	72471081	Screw, 3x8mm	
V201	23848082	Supporter	
V203	70867457	Spacer	
X601	23153847	Resonator, 4MHz, TCR1014	
Z601	24000916	Resistor Block, 4. 7K x4	
U301	70197838	P C Board Assy, VIDEO 2	

INTEGRATED CIRCUITS

IC401	B0379305	IC	TA8632N
IC481	70119858	IC	LA7311

TRANSISTORS

Q402	A6332430	Transistor	2SC2458-Y
Q403	A6534430	Transistor	2SA1048-Y

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
Q404	A6332430	Transistor	2SC2458-Y	
Q405	A6332430	Transistor	2SC2458-Y	
Q406	A6332430	Transistor	2SC2458-Y	
Q407	A6332430	Transistor	2SC2458-Y	
Q408	A6332430	Transistor	2SC2458-Y	
Q409	A6012040	Transistor	RN2204	
Q461	A6534430	Transistor	2SA1048-Y	
Q462	A6332430	Transistor	2SC2458-Y	
Q463	A6332430	Transistor	2SC2458-Y	
Q464	A6332430	Transistor	2SC2458-Y	
Q482	A6012020	Transistor	RN2202	

DIODES

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
D401	A7160570	Diode	1SS176	
D402	A7160570	Diode	1SS176	
D461	A7160570	Diode	1SS176	
D481	A7151450	Diode	1SS200	
D482	A7160570	Diode	1SS176	
D483	A7160570	Diode	1SS176	
D484	A7160570	Diode	1SS176	

COILS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
L401	23237817	Coil, Peaking	TRF4681AC	
L402	23237817	Coil, Peaking	TRF4681AC	
L404	23237977	Coil, Peaking	TRF4680AC	
L405	23237984	Coil, Peaking	TRF4180AC	
L406	23237987	Coil, Peaking	TRF4100AC	
L407	23237971	Coil, Peaking	TRF4221AC	
L461	23237988	Coil, Peaking	TRF4829AC	

CAPACITORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C401	24632470	Cap, Electrolytic	47MF	M 10V
C402	24538104	Cap, Plastic	0. 1MF	J 50V
C403	24436471	Cap, Ceramic	470PF	J 50V
C404	24436820	Cap, Ceramic	82PF	J 50V
C405	24436101	Cap, Ceramic	100PF	J 50V
C406	24636010	Cap, Electrolytic	1MF	M 50V
C407	24632470	Cap, Electrolytic	47MF	M 10V
C408	24474103	Cap, Ceramic	0. 01MF	N 50V
C409	24474103	Cap, Ceramic	0. 01MF	N 50V
C410	24474103	Cap, Ceramic	0. 01MF	N 50V
C411	24474103	Cap, Ceramic	0. 01MF	N 50V
C412	24538683	Cap, Plastic	0. 068MF	J 50V
C413	24474103	Cap, Ceramic	0. 01MF	N 50V
C415	24436759	Cap, Ceramic	7.5PF	J 50V
C416	24474103	Cap, Ceramic	0. 01MF	N 50V
C417	24636010	Cap, Electrolytic	1MF	M 50V
C418	24474103	Cap, Ceramic	0. 01MF	N 50V
C419	24474103	Cap, Ceramic	0. 01MF	N 50V
C420	24340470	Cap, Ceramic	47PF	J 50V
C421	24636010	Cap, Electrolytic	1MF	M 50V
C422	24591103	Cap, Plastic	0. 01MF	J 50V
C423	24591202	Cap, Plastic	2000PF	J 50V
C424	24472180	Cap, Ceramic	18PF	J 50V
C425	24636010	Cap, Electrolytic	1MF	M 50V
C426	24474103	Cap, Ceramic	0. 01MF	N 50V
C427	24632470	Cap, Electrolytic	47MF	M 10V
C428	24474103	Cap, Ceramic	0. 01MF	N 50V
C429	24353510	Cap, Ceramic	51PF	J 50V
C430	24474103	Cap, Ceramic	0. 01MF	N 50V
C431	24474103	Cap, Ceramic	0. 01MF	N 50V
C432	24436391	Cap, Ceramic	390PF	J 50V
C433	24636010	Cap, Electrolytic	1MF	M 50V
C434	24473180	Cap, Ceramic	18PF	J 50V
C461	24632470	Cap, Electrolytic	47MF	M 10V
C462	24474271	Cap, Ceramic	270PF	K 50V
C463	24436201	Cap, Ceramic	200PF	J 50V
C464	24474103	Cap, Ceramic	0. 01MF	N 50V
C481	24436121	Cap, Ceramic	120PF	J 50V
C482	24636478	Cap, Electrolytic	0. 47MF	M 50V
C483	24632470	Cap, Electrolytic	47MF	M 10V
C484	24474103	Cap, Ceramic	0. 01MF	N 50V
C485	24474103	Cap, Ceramic	0. 01MF	N 50V
C486	24632470	Cap, Electrolytic	47MF	M 10V
C487	24636339	Cap, Electrolytic	3. 3MF	M 50V
C488	24636339	Cap, Electrolytic	3. 3MF	M 50V

RESISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R401	24366333	Res, Carbon	33K	J 1/6W
R402	24366123	Res, Carbon	12K	J 1/6W
R403	24366391	Res, Carbon	390	J 1/6W
R404	24366182	Res, Carbon	1. 8K	J 1/6W
R405	24366222	Res, Carbon	2. 2K	J 1/6W
R406	24366362	Res, Carbon	3. 6K	J 1/6W
R407	24366102	Res, Carbon	1K	J 1/6W
R408	24366222	Res, Carbon	2. 2K	J 1/6W
R409	24366511	Res, Carbon	510	J 1/6W
R410	24366102	Res, Carbon	1K	J 1/6W
R412	24367622	Res, Carbon	6.2K	G 1/6W
R413	24367182	Res, Carbon	1. 8K	G 1/6W
R414	24366181	Res, Carbon	180	J 1/6W
R415	24366102	Res, Carbon	1K	J 1/6W
R416	24366682	Res, Carbon	6. 8K	J 1/6W
R417	24366431	Res, Carbon	430	J 1/6W
R418	24366182	Res, Carbon	1. 8K	J 1/6W
R419	24366272	Res, Carbon	2. 7K	J 1/6W
R420	24366333	Res, Carbon	33K	J 1/6W
R421	24366272	Res, Carbon	2. 7K	J 1/6W
R422	24366273	Res, Carbon	27K	J 1/6W
R423	24366561	Res, Carbon	560	J 1/6W
R424	24366682	Res, Carbon	6. 8K	J 1/6W
R425	24366470	Res, Carbon	47	J 1/6W
R426	24366391	Res, Carbon	390	J 1/6W
R427	24366392	Res, Carbon	3. 9K	J 1/6W
R428	24366202	Res, Carbon	2K	J 1/6W
R429	24366103	Res, Carbon	10K	J 1/6W
R430	24366222	Res, Carbon	2. 2K	J 1/6W
R431	24366224	Res, Carbon	220K	J 1/6W
R432	24366333	Res, Carbon	33K	J 1/6W
R433	24366682	Res, Carbon	6. 8K	J 1/6W
R434	24366101	Res, Carbon	100	J 1/6W
R435	24366133	Res, Carbon	13K	J 1/6W
R436	24366123	Res, Carbon	12K	J 1/6W
R437	24366470	Res, Carbon	47	J 1/6W
R438	24366222	Res, Carbon	2. 2K	J 1/6W
R439	24366223	Res, Carbon	22K	J 1/6W
R440	24366752	Res, Carbon	7. 5K	J 1/6W
R441	24366332	Res, Carbon	3. 3K	J 1/6W
R442	24366391	Res, Carbon	390	J 1/6W
R443	24366102	Res, Carbon	1K	J 1/6W
R444	24366105	Res, Carbon	1M	J 1/6W
R445	24366621	Res, Carbon	620	J 1/6W
R446	24366221	Res, Carbon	220	J 1/6W
R451	24066956	Res, Variable	500	
R452	24066954	Res, Variable	2K	
R461	24366472	Res, Carbon	4. 7K	J 1/6W
R462	24366332	Res, Carbon	3. 3K	J 1/6W
R463	24366561	Res, Carbon	560	J 1/6W
R464	24367112	Res, Carbon	1. 1K	G 1/6W
R465	24366181	Res, Carbon	180	J 1/6W
R466	24366201	Res, Carbon	200	J 1/6W
R467	24366471	Res, Carbon	470	J 1/6W
R468	24366152	Res, Carbon	1. 5K	J 1/6W
R469	24367102	Res, Carbon	1K	G 1/6W
R470	24367102	Res, Carbon	1K	G 1/6W
R471	24367152	Res, Carbon	1.5K	G 1/6W
R472	24366222	Res, Carbon	2. 2K	J 1/6W
R473	24366333	Res, Carbon	33K	J 1/6W
R481	24366273	Res, Carbon	27K	J 1/6W
R482	24366332	Res, Carbon	3. 3K	J 1/6W
R483	24366102	Res, Carbon	1K	J 1/6W
R484	24366682	Res, Carbon	6. 8K	J 1/6W
R485	24366561	Res, Carbon	560	J 1/6W
R486	24366682	Res, Carbon	6. 8K	J 1/6W
R487	24366472	Res, Carbon	4. 7K	J 1/6W
R488	24366152	Res, Carbon	1. 5K	J 1/6W
R489	24366182	Res, Carbon	1. 8K	J 1/6W
R490	24366822	Res, Carbon	8. 2K	J 1/6W
R491	24366821	Res, Carbon	820	J 1/6W
R492	24366223	Res, Carbon	22K	J 1/6W
R493	24366223	Res, Carbon	22K	J 1/6W
R494	24366684	Res, Carbon	680K	J 1/6W
R495	24366105	Res, Carbon	1M	J 1/6W

MISCELLANEOUS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
W204	70160923	Wire		
W205	70160924	Wire		
X401	23153979	Crystal, 4. 43MHz		
X461	70138100	Function Unit, EFD-CFA11A		
Z401	23107645	Filter, 4.43MHz, TLC1108		
Z402	23107794	Filter, TLC1041, 4. 16MHz		
Z461	23107644	Filter, 3.5MHz, TLC1104		
U601	70197851	P C Board Assy, LOGIC 2		

TRANSISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
QL31	A6012030	Transistor	RN2203	
QL32	A6002020	Transistor	RN1202	

CAPACITORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CL31	24205479	Cap, Electrolytic	4. 7MF	M 35V

RESISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RL31	24366363	Res, Carbon	36K	J 1/6W
RL32	24366472	Res, Carbon	4. 7K	J 1/6W
RL33	24366103	Res, Carbon	10K	J 1/6W
UL01	70197839	P C Board Assy, LOGIC CTL		

DIODES

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
DX02	A7160590	Diode	1SS177	
DX03	A7160590	Diode	1SS177	
DX18	A8606316	Diode, LED	TLG133A-FA	

RESISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R358	24069700	Res, Variable	10K	
R556	24069696	Res, Variable	500K	

MISCELLANEOUS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
SL03	23145394	Push Swltch, 1C1P		
SL05	23145394	Push Swltch, 1C1P		
SL06	23145394	Push Swltch, 1C1P		
SL07	23145394	Push Swltch, 1C1P		
SL08	23145394	Push Swltch, 1C1P		
SL09	23145394	Push Swltch, 1C1P		
SL10	23145394	Push Swltch, 1C1P		
SX20	23145394	Push Swltch, 1C1P		
U701	70197771	P C Board Assy, AUDIO, DV-90G		
U701	70197685	P C Board Assy, AUDIO, DV-90T/W		

INTEGRATED CIRCUITS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
IC701	70119790	IC	BA7751ALS	
IC702	70119791	IC	BA7755	

TRANSISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
Q705	A6319300	Transistor	2SC1959-Y	
Q706	A6002040	Transistor	RN1204	
Q707	A6002040	Transistor	RN1204	

COILS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
L701	23238723	Coil, Peaking	TRF4682AC	
L702	23221937	Coil, Choke	TLN3040	
* L703	70103011	Coil, Bead Core	RH35061. 3	

CAPACITORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C701	24214122	Cap, Ceramic	1200PF	K 500V
C702	24206010	Cap, Electrolytic	1MF	M 50V
C703	24205479	Cap, Electrolytic	4. 7MF	M 35V
C704	24205479	Cap, Electrolytic	4. 7MF	M 35V
C705	24591103	Cap, Plastic	0. 01MF	J 50V
C706	24206010	Cap, Electrolytic	1MF	M 50V
C707	24203470	Cap, Electrolytic	47MF	M 16V
C708	24206010	Cap, Electrolytic	1MF	M 50V
C709	24203100	Cap, Electrolytic	10MF	M 16V
C710	24591183	Cap, Plastic	0. 018MF	J 50V
C711	24205479	Cap, Electrolytic	4. 7MF	M 35V
C712	24203330	Cap, Electrolytic	33MF	M 16V
C713	24205479	Cap, Electrolytic	4. 7MF	M 35V
C714	24203330	Cap, Electrolytic	33MF	M 16V
C715	24203220	Cap, Electrolytic	22MF	M 16V
C716	24203470	Cap, Electrolytic	47MF	M 16V
C717	24212472	Cap, Ceramic	4700PF	K 50V
C718	24591682	Cap, Plastic	6800PF	J 50V
C719	24538683	Cap, Plastic	0. 068MF	J 50V
C720	24214221	Cap, Ceramic	220PF	K 500V
C730	24232103	Cap, Ceramic	0. 01MF	Z 50V
C731	24232103	Cap, Ceramic	0. 01MF	Z 50V
C732	24538103	Cap, Plastic	0. 01MF	J 50V

RESISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R701	24366223	Res, Carbon	22K	J 1/6W
R702	24366470	Res, Carbon	47	J 1/6W
R703	24366221	Res, Carbon	220	J 1/6W
R704	24366123	Res, Carbon	12K	J 1/6W
R705	24366334	Res, Carbon	330K	J 1/6W
R706	24366105	Res, Carbon	1M	J 1/6W
R707	24366223	Res, Carbon	22K	J 1/6W
R708	24366104	Res, Carbon	100K	J 1/6W
R709	24366183	Res, Carbon	18K	J 1/6W
R710	24366152	Res, Carbon	1. 5K	J 1/6W
R711	24366103	Res, Carbon	10K	J 1/6W
R712	24366221	Res, Carbon	220	J 1/6W
R713	24366393	Res, Carbon	39K	J 1/6W
R714	24366103	Res, Carbon	10K	J 1/6W
R715	24366273	Res, Carbon	27K	J 1/6W
R716	24366752	Res, Carbon	7. 5K	J 1/6W
R718	24366101	Res, Carbon	100	J 1/6W
R719	24366153	Res, Carbon	15K	J 1/6W
R720	24366333	Res, Carbon	33K	J 1/6W
R751	24066939	Res, Variable	10K	
R752	24066935	Res, Variable	200K	

MISCELLANEOUS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
T701	23224971	Coil, TLN1053		
U802	70197844	P C Board Assy, POWER 1, DV-90G		
U802	70197954	P C Board Assy, POWER 1, DV-90W		
U802	70197796	P C Board Assy, POWER 1, DV-90T		

TRANSISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
Q801	23314162	Transistor	2SD1379	
Q802	A6002010	Transistor	RN1201	
Q803	A6002010	Transistor	RN1201	
Q804	A6534430	Transistor	2SA1048-Y	

DIODES

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
⚠D801	23118485	Diode	ERC04-02F	
⚠D802	23118485	Diode	ERC04-02F	
⚠D803	A7568500	Diode	1S1885	
⚠D804	A7568500	Diode	1S1885	
⚠D805	A7568500	Diode	1S1885	
⚠D806	A7568500	Diode	1S1885	
⚠D807	A7568500	Diode	1S1885	
⚠D808	A7568500	Diode	1S1885	
D809	A7160570	Diode	1SS176	
D810	A7110410	Diode, Zener	05Z 12-X	

CAPACITORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C803	24232223	Cap, Ceramic	0. 022MF	Z 50V
C804	24232223	Cap, Ceramic	0. 022MF	Z 50V
C805	24232223	Cap, Ceramic	0. 022MF	Z 50V
C806	24232223	Cap, Ceramic	0. 022MF	Z 50V
⚠C807	24796222	Cap, Electrolytic	2200MF	M 35V
⚠C808	24794472	Cap, Electrolytic	4700MF	M 16V
⚠C809	24795222	Cap, Electrolytic	2200MF	M 25V
C810	24538473	Cap, Plastic	0. 047MF	J 50V

RESISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R801	24366123	Res, Carbon	12K	J 1/6W
R802	24366822	Res, Carbon	8. 2K	J 1/6W
R803	24366223	Res, Carbon	22K	J 1/6W
R804	24366153	Res, Carbon	15K	J 1/6W
R805	24366472	Res, Carbon	4. 7K	J 1/6W
R806	24366103	Res, Carbon	10K	J 1/6W
R807	24553821	Res, Oxide Metal	820	J 1W

MISCELLANEOUS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
⚠F802A	23165102	Fuse Holder		
⚠F803A	23165102	Fuse Holder		
⚠F804A	23165102	Fuse Holder		
U802A	72471081	Screw, 3x8mm		
U803	70197845	P C Board Assy, POWER 2, DV-90G		
U803	70197955	P C Board Assy, POWER 2, DV-90W		
U803	70197797	P C Board Assy, POWER 2, DV-90T		

INTEGRATED CIRCUITS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
IC811	70119737	IC	BA10324	

TRANSISTORS

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
Q812	A6867970	Transistor	2SD1405-BL	
Q813	A6867970	Transistor	2SD1405-BL	
Q814	A6867970	Transistor	2SD1405-BL	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
DIODES				
D821	A7160570	Diode	1SS176	
D822	A7110017	Diode,Zener	05Z 5. 6-Y	
D824	A7568500	Diode	1S1885	
D825	A7568500	Diode	1S1885	
CAPACITORS				
C811	24204330	Cap,Electrolytic	33MF	M 25V
C812	24203220	Cap,Electrolytic	22MF	M 16V
C813	24203220	Cap,Electrolytic	22MF	M 16V
RESISTORS				
R811	24366152	Res,Carbon	1. 5K	J 1/6W
R812	24366222	Res,Carbon	2. 2K	J 1/6W
R813	24367202	Res,Carbon	2K	G 1/6W
R814	24367162	Res,Carbon	1. 6K	G 1/6W
R815	24366152	Res,Carbon	1. 5K	J 1/6W
R816	24367362	Res,Carbon	3.6K	G 1/6W
R817	24367182	Res,Carbon	1. 8K	G 1/6W
R818	24367301	Res,Carbon	300	G 1/6W
R819	24367122	Res,Carbon	1. 2K	G 1/6W
R851	24066985	Res,Variable	1K	
MISCELLANEOUS				
Q812B	70391334	Screw,3x8mm		
Q812C	72471081	Screw,3x8mm		
Q813A	70391334	Screw,3x8mm		
Q814A	70391334	Screw,3x8mm		
U804	70197846	P C Board Assy,LINE FILTER,DV-90G		
U804	70197956	P C Board Assy,LINE FILTER,DV-90W		
U804	70197798	P C Board Assy,LINE FILTER,DV-90T		
CAPACITORS				
*⚠C801	24094916	Cap,Ceramic	0.0047MF	400V
⚠C802	24094916	Cap,Ceramic	0.0047MF	400V
X⚠C802	24095831	Cap,Plastic	0.1MF	M 250V
MISCELLANEOUS				
⚠F801A	23165102	Fuse Holder		
P802	23367026	Plug,3P		
P803	23367026	Plug,3P		
*⚠T801	23211997	Line filter,TRE3004C		
U003	70197843	P C Board Assy,RF MOD,DV-90G		
U003	70197795	P C Board Assy,RF MOD,DV-90T/W		
UF02	70197842	P C Board Assy,TERMINAL,DV-90G		
UF02	70197794	P C Board Assy,TERMINAL,DV-90T/W		
INTEGRATED CIRCUITS				
ICF01	70119857	IC	BA7021	
ICF02	70119857	IC	BA7021	
TRANSISTORS				
QF03	A6002020	Transistor	RN1202	
QF04	A6012020	Transistor	RN2202	
QF05	A6002010	Transistor	RN1201	
QF06	A6534430	Transistor	2SA1048-Y	
QF07	A6332430	Transistor	2SC2458-Y	
QF08	A6342200	Transistor	2SC2878A	
QF09	A6342200	Transistor	2SC2878A	
QF61	A6332430	Transistor	2SC2458-Y	
QF62	A6534430	Transistor	2SA1048-Y	
DIODES				
DF01	A7160570	Diode	1SS176	
DF02	A7152800	Diode	1SS227	
DF03	A7152800	Diode	1SS227	
DF04	A7152800	Diode	1SS227	
CAPACITORS				
* CF01	24591123	Cap,Plastic	0. 012MF	J 50V
CF01	24591153	Cap,Plastic	0.015MF	J 50V
CF02	24232103	Cap,Ceramic	0. 01MF	Z 50V
CF03	24201470	Cap,Electrolytic	47MF	M 6.3V
* CF04	24214222	Cap,Ceramic	2200PF	K 500V
CF05	24203470	Cap,Electrolytic	47MF	M 16V
CF06	24232103	Cap,Ceramic	0. 01MF	Z 50V
CF07	24793471	Cap,Electrolytic	470MF	M 10V
CF08	24202101	Cap,Electrolytic	100MF	M 10V
CF09	24203100	Cap,Electrolytic	10MF	M 16V
CF10	24203100	Cap,Electrolytic	10MF	M 16V
CF11	24232223	Cap,Ceramic	0. 022MF	Z 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CF12	24436181	Cap,Ceramic	180PF	J 50V
CF61	24206010	Cap,Electrolytic	1MF	M 50V
CF62	24206010	Cap,Electrolytic	1MF	M 50V
CF63	24232103	Cap,Ceramic	0. 01MF	Z 50V
CF64	24201470	Cap,Electrolytic	47MF	M 6.3V
CF65	24203470	Cap,Electrolytic	47MF	M 16V
RESISTORS				
RF01	24366563	Res,Carbon	56K	J 1/6W
RF02	24366562	Res,Carbon	5. 6K	J 1/6W
RF04	24366103	Res,Carbon	10K	J 1/6W
RF05	24366332	Res,Carbon	3. 3K	J 1/6W
RF06	24366392	Res,Carbon	3. 9K	J 1/6W
RF07	24366102	Res,Carbon	1K	J 1/6W
RF08	24366563	Res,Carbon	56K	J 1/6W
RF09	24366472	Res,Carbon	4. 7K	J 1/6W
RF10	24366103	Res,Carbon	10K	J 1/6W
RF12	24366471	Res,Carbon	470	J 1/6W
RF13	24366911	Res,Carbon	910	G 1/6W
RF14	24380681	Res,Carbon	680	J 1/8W
RF15	24366102	Res,Carbon	1K	J 1/6W
RF16	24366820	Res,Carbon	82	J 1/6W
RF17	24366102	Res,Carbon	1K	J 1/6W
RF18	24366472	Res,Carbon	4. 7K	J 1/6W
RF21	24366103	Res,Carbon	10K	J 1/6W
RF22	24366751	Res,Carbon	750	J 1/6W
RF24	24367331	Res,Carbon	330	G 1/6W
RF25	24366561	Res,Carbon	560	J 1/6W
RF26	24367331	Res,Carbon	330	G 1/6W
RF27	24366680	Res,Carbon	68	J 1/6W
RF28	24366332	Res,Carbon	3. 3K	J 1/6W
RF30	24366391	Res,Carbon	390	J 1/6W
RF60	24366561	Res,Carbon	560	J 1/6W
RF62	24366472	Res,Carbon	4. 7K	J 1/6W
RF63	24366222	Res,Carbon	2. 2K	J 1/6W
RF64	24366101	Res,Carbon	100	J 1/6W
RF65	24366183	Res,Carbon	18K	J 1/6W
RF66	24367391	Res,Carbon	390	G 1/6W
RF67	24366112	Res,Carbon	1. 1K	J 1/6W
RF68	24366512	Res,Carbon	5. 1K	J 1/6W
RF69	24367202	Res,Carbon	2K	G 1/6W
MISCELLANEOUS				
PF01	23116334	Socket,21P		
SF01	23145412	Slide Switch,2C2P		
UI06	70197624	P C Board Assy,Cam SW		
UI07	70197625	P C Board Assy,ACE Head		
RESISTORS				
RI71	24366100	Res,Carbon	10	J 1/6W
UI08	70197626	P C Board Assy,Loading Motor		
UI02	70197620	P C Board Assy,F/L (L)		
CAPACITORS				
CI21	24232103	Cap,Ceramic	0. 01MF	Z 50V
UI03	70197621	P C Board Assy,F/L (R)		
CAPACITORS				
CI31	24232103	Cap,Ceramic	0. 01MF	Z 50V
UI04	70197622	P C Board Assy,Reel (s)		
UI05	70197623	P C Board Assy,Reel (T)		
UV01	70197799	P C Board Assy,DIGITAL		
INTEGRATED CIRCUITS				
ICV01	70119768	IC	T671147	
ICV02	23119315	IC	MB40776	
ICV03	23119457	IC	MB40576	
ICV04	B0430281	IC	TMM41464P-12	
ICV05	B0430281	IC	TMM41464P-12	
ICV06	B0430281	IC	TMM41464P-12	
ICV07	B0430281	IC	TMM41464P-12	
ICV08	B0430281	IC	TMM41464P-12	
ICV09	B0430281	IC	TMM41464P-12	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
ICV10	B0325660	IC	TA7374P	

TRANSISTORS

QV21	A6534430	Transistor	2SA1048-Y
QV22	A6534430	Transistor	2SA1048-Y
QV23	A6534430	Transistor	2SA1048-Y
QV24	A6534430	Transistor	2SA1048-Y
QV25	A6332540	Transistor	2SC2668-Y
QV26	A6534430	Transistor	2SA1048-Y
QV27	A6002020	Transistor	RN1202
QV28	A6332430	Transistor	2SC2458-Y
QV29	A6332540	Transistor	2SC2668-Y
QV30	A6332540	Transistor	2SC2668-Y

DIODES

DV01	A7151450	Diode	1SS200

COILS

LV01	23238912	Coil, Peaking	TRF4680AC
LV02	23238922	Coil, Peaking	TRF4829AC
LV03	23237839	Coil, Peaking	TRF4820AF
LV04	23237843	Coil, Peaking	TRF4560AF
LV05	70103011	Coil, Bead Core	RH35061. 3
LV06	23238921	Coil, Peaking	TRF4120AC
LV07	70103011	Coil, Bead Core	RH35061. 3
LV08	23237998	Coil, Peaking	TRF4129AC
LV09	70103011	Coil, Bead Core	RH35061. 3
LV10	70103011	Coil, Bead Core	RH35061. 3
LV11	23237989	Coil, Peaking	TRF4689AC

CAPACITORS

CV01	24201470	Cap, Electrolytic	47MF	M 6.3V
CV02	24201470	Cap, Electrolytic	47MF	M 6.3V
CV03	24474103	Cap, Ceramic	0. 01MF	N 50V
CV05	24204479	Cap, Electrolytic	4.7MF	M 25V
CV06	24201470	Cap, Electrolytic	47MF	M 6.3V
CV07	24201470	Cap, Electrolytic	47MF	M 6.3V
CV08	24201470	Cap, Electrolytic	47MF	M 6.3V
CV09	24436151	Cap, Ceramic	150PF	J 50V
CV10	24473479	Cap, Ceramic	4. 7PF	K 50V
CV11	24473270	Cap, Ceramic	27PF	J 50V
CV12	24473569	Cap, Ceramic	5.6PF	K 50V
CV13	24474471	Cap, Ceramic	470PF	K 50V
CV14	24201220	Cap, Electrolytic	22MF	M 6.3V
CV15	24201470	Cap, Electrolytic	47MF	M 6.3V
CV16	24474103	Cap, Ceramic	0. 01MF	N 50V
CV17	24204479	Cap, Electrolytic	4.7MF	M 25V
CV18	24474103	Cap, Ceramic	0. 01MF	N 50V
CV19	24201470	Cap, Electrolytic	47MF	M 6.3V
CV21	24474103	Cap, Ceramic	0. 01MF	N 50V
CV22	24206229	Cap, Electrolytic	2. 2MF	M 50V
CV23	24353080	Cap, Ceramic	8PF	J 50V
CV24	24353090	Cap, Ceramic	9PF	J 50V
CV25	24474103	Cap, Ceramic	0. 01MF	N 50V
CV26	24201470	Cap, Electrolytic	47MF	M 6.3V
CV27	24474103	Cap, Ceramic	0. 01MF	N 50V
CV28	24474103	Cap, Ceramic	0. 01MF	N 50V
CV29	24353300	Cap, Ceramic	30PF	J 50V
CV30	24474102	Cap, Ceramic	1000PF	K 50V
CV31	24473470	Cap, Ceramic	47PF	J 50V
CV32	24473470	Cap, Ceramic	47PF	J 50V
CV33	24473470	Cap, Ceramic	47PF	J 50V
CV34	24474103	Cap, Ceramic	0. 01MF	N 50V
CV35	24474103	Cap, Ceramic	0. 01MF	N 50V
CV36	24474103	Cap, Ceramic	0. 01MF	N 50V
CV37	24201470	Cap, Electrolytic	47MF	M 6.3V
CV38	24474103	Cap, Ceramic	0. 01MF	N 50V
CV39	24201470	Cap, Electrolytic	47MF	M 6.3V
CV40	24538104	Cap, Plastic	0. 1MF	J 50V
CV41	24538104	Cap, Plastic	0. 1MF	J 50V
CV42	24538104	Cap, Plastic	0. 1MF	J 50V
CV43	24538104	Cap, Plastic	0. 1MF	J 50V
CV44	24538104	Cap, Plastic	0. 1MF	J 50V
CV45	24538104	Cap, Plastic	0. 1MF	J 50V
CV47	24201470	Cap, Electrolytic	47MF	M 6.3V
CV48	24474102	Cap, Ceramic	1000PF	K 50V
CV49	24474101	Cap, Ceramic	100PF	K 50V
CV60	24474102	Cap, Ceramic	1000PF	K 50V
CV61	24473470	Cap, Ceramic	47PF	J 50V
CV62	24201470	Cap, Electrolytic	47MF	M 6.3V
CV63	24436470	Cap, Ceramic	47PF	J 50V

RESISTORS

RV01	24367562	Res, Carbon	5. 6K	G 1/6W
RV03	24367332	Res, Carbon	3. 3K	G 1/6W
RV04	24366821	Res, Carbon	820	J 1/6W
RV05	24366472	Res, Carbon	4. 7K	J 1/6W
RV06	24366334	Res, Carbon	330K	J 1/6W
RV07	24366133	Res, Carbon	13K	J 1/6W
RV08	24366122	Res, Carbon	1. 2K	J 1/6W
RV09	24367680	Res, Carbon	68	G 1/6W
RV10	24366152	Res, Carbon	1. 5K	J 1/6W
RV11	24366331	Res, Carbon	330	J 1/6W
RV12	24366331	Res, Carbon	330	J 1/6W
RV13	24366221	Res, Carbon	220	J 1/6W
RV14	24366472	Res, Carbon	4. 7K	J 1/6W
RV15	24367152	Res, Carbon	1.5K	G 1/6W
RV16	24366122	Res, Carbon	1. 2K	J 1/6W
RV17	24367132	Res, Carbon	1. 3K	G 1/6W
RV18	24366470	Res, Carbon	47	J 1/6W
RV19	24366102	Res, Carbon	1K	J 1/6W
RV20	24366822	Res, Carbon	8. 2K	J 1/6W
RV21	24366102	Res, Carbon	1K	J 1/6W
RV22	24366511	Res, Carbon	510	J 1/6W
RV23	24367332	Res, Carbon	3. 3K	G 1/6W
RV24	24367362	Res, Carbon	3.6K	G 1/6W
RV25	24366392	Res, Carbon	3. 9K	J 1/6W
RV26	24366272	Res, Carbon	2. 7K	J 1/6W
RV27	24366301	Res, Carbon	300	J 1/6W
RV28	24366201	Res, Carbon	200	J 1/6W
RV29	24366102	Res, Carbon	1K	J 1/6W
RV30	24366182	Res, Carbon	1. 8K	J 1/6W
RV31	24366331	Res, Carbon	330	J 1/6W
RV32	24366102	Res, Carbon	1K	J 1/6W
RV33	24366102	Res, Carbon	1K	J 1/6W
RV34	24366102	Res, Carbon	1K	J 1/6W
RV35	24366102	Res, Carbon	1K	J 1/6W
RV36	24366510	Res, Carbon	51	J 1/6W

MISCELLANEOUS

VV01A	23772306	Screw, 3x0. 5x6mm
ZV01	23107742	Filter, TEM1014
ZV06	23107742	Filter, TEM1014
ZV07	23107742	Filter, TEM1014

MECHANICAL PARTS

A101	70812740	Front Panel, DV-90G
A101	70812725	Front Panel, DV-90T/W
A101A	70391412	Screw, 3x12mm, DV-90G/W
A101A	23721308	Screw, 3x12mm, DV-90T
A101B	70391355	Screw, 3x8mm
A101D	70863845	Door
A101G	70393022	Push Nut
A104	70824265	Top Cover, DV-90G
A104	70824255	Top Cover, DV-90T/W
A104C	70391414	Screw, 3x8mm
A105	70863872	Door
A105A	70351679	Spring
A106	70826427	Knob
A120	70815138	Bottom Cover, DV-90G
A120	70815150	Bottom Cover, DV-90T/W
A120A	70391355	Screw, 3x8mm
A701	70913854	Case, DV-90G
A701	70913985	Case, DV-90T
A701	70913984	Cacs, DV-90W
A702	70921251	Packing (U)
A703	70921238	Packing (L)
A708	70915052	Sheet
AT01	70108163	Case
AT02	70108086	Case
AT03	70108020	Case
AT04	70108018	Filter
B101	70321854	Lever Assy
B101L	70391342	Screw, 2x4mm
B101M	70351689	Spring
B104	70396193	Washer, FI 2. 6x6x 0. 5mm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
B111	70323310	Pinch Roller Assy
B112	70396196	Washer,FI 3. 6x8x 0. 5mm
B113	70396193	Washer,FI 2. 6x6x 0. 5mm
B121	70328339	Tension Lever Assy
B126	70351747	Tension Spring
B127	70325029	Band Brake assy
B128	23721310	Screw,3x10mm
B209	23723308	Screw,3x8mm
B210	70391081	Screw,4x12mm
B231	70325080	Earth Brush Assy
B232	70391345	Screw,3x3mm
B401	70322343	S Loading Ring Assy
B401G	70351634	Spring
B402	70391368	Screw
B405	70322354	T Slider Sub Assy
B406	70391361	Screw, 2. 6x3mm
B407	70322380	S Guide Roller Assy
B407E	70378598	Screw
B411	70322345	T Loading Ring Assy
B411G	70351635	Spring
B412	70391368	Screw
B416	70391361	Screw, 2. 6x3mm
B417	70353115	O-ring
B418	70353115	O-ring
B420	70322379	T Guide Roller Assy
B420E	70378598	Screw
B501	70368130	Ring Guide Roller(L1)
B501A	70368131	Ring Guide Roller(L2)
B502	70368129	Ring Guide Roller(U)
B503	70396196	Washer,FI 3. 6x8x 0. 5mm
B504	70333230	Loading Ring Gear A
B506	70333231	Loading Ring Gear B
B507	70368116	Double Cap
B509	70391334	Screw,3x8mm
B513	70333229	Phase Gear
B515	70333196	Loading Drive Gear
B516	70351676	Spring
B521	70347034	Polislider 4. 1x 6. 5x 0. 50mm
B525	70396193	Washer,FI 2. 6x6x 0. 5mm
B526	70323304	Cam Lever
B527	70368122	Stopper
B535	70351683	Spring
B539	70351631	Spring
B541	70396193	Washer,FI 2. 6x6x 0. 5mm
B542	70363305	Lever
B550	70312196	Loading Drive Assy
B553	70396064	Washer,5. 0x 2. 1x 0. 5mm
B554	70351641	Spring
B555	70351675	Spring
B556	70312193	Loading Motor Assy
B556B	70125222	DC Motor
B557	23723264	Screw, 2. 6x4mm
B558	70342123	Belt
B562	70396191	Washer,FI 2. 1x5x 0. 5mm
B565	70333197	Cam Gear
B566	70396193	Washer,FI 2. 6x6x 0. 5mm
B571	70391334	Screw,3x8mm
B603	70391358	Screw,4x12mm
B604A	70391081	Screw,4x12mm
B604B	70391048	Screw,3x6mm
BM31	70125237	Capstan Motor Assy
D101	70115406	Diode,LED GL450V
⚠F801	23144129	Fuse,2A
⚠F802	23144164	Fuse,250V, 1. 25A
⚠F803	23144970	Fuse,1.6A
⚠F804	23144970	Fuse,1.6A
G001	70311374	Cylinder Assy,C4S2P
G101	70325087	Upper Cylinder Assy
G101A	70391376	Screw
G102	70321890	Lower Cylinder
G103	70321601	Ground Cap Assy
G104	70325096	Lower Cylinder Assy
G130A	23712011	Screw, 2. 6x8mm
G154	70391372	Screw
G155	23731306	Screw,3x5x6mm

LOCATION NUMBER	PART NUMBER	DESCRIPTION
G175B	23030082	Screw,3x4mm
G178C	70391373	Screw, 2. 6x4mm
G202	70322372	Lever Assy
G204	70391351	Screw, 2. 6x8mm
G205	70346035	Impedance Roller
G206	70396050	Washer,3. 9x 2. 1x 0. 5mm
G207	70396190	Washer,FI 1. 6x6x 0. 5mm
G209	70351694	Spring
G210	70351662	Spring
G211	70378512	Flange
G212	70378511	Sleeve
G213	70393025	NUT, 3x3mm
G217	70378515	Flange
G218	70378511	Sleeve
G220	70393025	NUT, 3x3mm
G221	70368134	Guide Cap
G225	70182059	ACE Sub Base Assy
G230	70378601	Shaft
G231	70351665	Spring
G232	23002250	E-ring
G233	23712308	Screw, 3x0. 5x8mm
G234	70391322	Adjust Screw
G236	70351666	Spring
G237	70393026	Nut, 3x4. 5mm
G239	70392018	Taper Nut
H001	70121076	Tuner,EG432F
H002	70123131	RF MOD.,MMD251
H002B	72471081	Screw,3x8mm
H032	70183018	FE Head
K102	70326577	Reel Motor Assy
K103	70391334	Screw,3x8mm
K104	70391345	Screw,3x3mm
K110	70326575	Idler Assy
K114	70351677	Spring
K114B	70396221	Polyslider,5. 1x 8. 8x 0. 13mm
K115	70351703	Spring
K116	70396224	Polyslider,3. 6x 7. 5x 0. 5mm
K118	70391447	Screw,2.6x3mm
K130	70316148	S Sensor Assy
K131	23721312	Screw,3x12mm
K132	70316147	T Sensor Assy
K133	23721312	Screw,3x12mm
K151	70317040	S Reel Table Assy
K151C	70351521	Spring
K152	70338075	Bearing
K153	70394153	Spacer
K155	70396193	Washer,FI 2. 6x6x 0. 5mm
K156	70363300	Lever
K157	70351700	Spring
K161	70317039	T Reel Table Assy
K161C	70351521	Spring
K162	70338100	Spacer
K163	70394153	Spacer
K165	70396193	Washer,FI 2. 6x6x 0. 5mm
K166	70326535	Lever Assy
K167	70351685	Spring
K169	70326533	Reverse Brake Assy
K170	70351706	Spring
K181	70326536	S Brake Assy
K185	70326537	T Brake Assy
K190	70351684	Spring
K301	70314248	Flont Loading Assy
K301A	70391049	Screw,3x8mm
K305	70396151	Washer,FI 2. 6
K306	70351680	Spring
K310	23723204	Screw,2x4mm
K311F	70351753	Spling
K312	70348167	Guide Roller(A)
K313	70348169	Guide Roller(C)
K315	70333242	Arm Gear L
K317	70333235	Arm Gear L
K318	70351752	Spring
K320A	23723305	Screw,3x5mm
K321C	23723310	Screw,3x10mm
K322	70333237	Worm Wheel

LOCATION NUMBER	PART NUMBER	DESCRIPTION	LOCATION NUMBER	PART NUMBER	DESCRIPTION
K323	70324321	Worm Gear Assy			
K323C	70396152	Washer,FI 1. 6			
K323D	70396050	Washer,3. 9x 2. 1x 0. 5mm			
K324	70324345	Motor Assy			
K324B	23723265	Screw, 2. 6x5mm			
K325C	70333238	Gear			
K326	70333240	Gear			
K326A	70333241	Gear			
K328A	23723264	Screw, 2. 6x4mm			
K330	70363330	Lever			
K335	23723205	Screw, 2. 5x5mm			
K336	23723206	Screw,2x6mm			
K339	23723206	Screw,2x6mm			
M005	70125222	DC Motor			
M101	70125246	Stator			
M101A	70391378	Screw,2x3mm			
M102	70125247	Rotor			
M102A	70391376	Screw			
⚠P801	23176720	Power Cord,250V,2.5A,DV-90G			
⚠P801	23176740	Power Cord,250V,2.5A,DV-90T/W			
⚠P801A	70846155	Cord Holder			
PT01	70108015	Terminal			
PT02	70108016	Terminal			
PT03	70108017	Terminal			
QI21	70114347	Transistor,Photo PN202S-S			
QI22	70114345	Transistor,Photo PN202S-R			
QI41	A6090130	Hall Sensor THS103A			
QI51	A6090130	Hall Sensor THS103A			
RG01	70213108	Dew Heater			
SI22	23145486	Leaf Switch			
SI23	23145487	Leaf Switch			
SI24	23145485	Leaf Switch			
SI25	23145484	Leaf Switch			
SI26	23145565	Leaf Switch			
ST01	70108164	Rubber			
⚠T802	23213567	Power Transformer,TPW1403AZ			
T802A	72471081	Screw,3x8mm			
U002A	72471081	Screw,3x8mm			
U101A	70391349	Screw, 2. 6x3mm			
U190A	70391434	Screw, 2. 6x6mm			
U190B	70391377	Screw, 2. 6x 0. 45x7. 4mm			
U202A	72471082	Screw,3x10mm			
U802A	72471081	Screw,3x8mm			
U803A	72471081	Screw,3x8mm			
U804A	72471081	Screw,3x8mm			
UT01	23333323	P C Board Assy,REMOTE CONTROL			
UV01A	72471082	Screw,3x10mm			
V251A	70391049	Screw,3x8mm			
V251B	70391081	Screw,4x12mm			
* V252A	72471082	Screw,3x10mm			
V801A	70391081	Screw,4x12mm			
V802A	70391355	Screw,3x8mm			
V802B	70391081	Screw,4x12mm			
VF01B	72471081	Screw,3x8mm			
VF01E	70391081	Screw,4x12mm			
W212A	72471081	Screw,3x8mm			
W213A	70391049	Screw,3x8mm			
WF31	70160922	Wire			
Y101	70941897	Owners Manual,DV-90G			
Y101	70941950	Owners Manual,DV-90T			
Y101	70941951	Owners Manual,DV-90W			
Y102	70941952	Owners Manual,DV-90W			
Y103	70942466	Sheet			
Y104	70933070	Cover			
Y105	23364494	ANT Cable,PAL			
Y106	70148253	Remote Control Unit,VC-90B			
ZI01A	23712306	Screw,3x0.5x6mm			
ZT01	23109327	Ceramic Resonator,CSB455E			